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Meeting Future Needs of Finnish Working Life Through a Healthy Workforce

2009 INTERNATIONAL EVALUATION OF THE FINNISH INSTITUTE OF OCCUPATIONAL HEALTH

MINISTRY OF SOCIAL AFFAIRS AND HEALTH
Finland

Göran Bondjers, Paulien Bongers, Marilyn Fingerhut, Timo Kauppinen, Stavroula Leka, Paul Schulte, Vappu Taipale, Hannu Uusitalo
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Executive summary

Göran Bondjers, Paulien Bongers, Marilyn Fingerhut, Timo Kauppinen, Stavroula Leka, Paul Schulte, Vappu Taipale, Hannu Uusitalo. Meeting Future Needs of Finnish Working Life Through a Healthy Workforce. 2009 International Evaluation of the Finnish Institute of Occupational Health.

The Finnish Institute of Occupational Health (FIOH), a sectoral institute of the Ministry of Social Affairs and Health (MSAH), is highly regarded nationally and internationally as a leading institution in the area of occupational health. This report provides the assessment of an International Evaluation Group (IEG) of scientists[1] who were requested by the Ministry of Social Affairs and Health in Finland to evaluate policy relevance and innovation chain efficiency of FIOH. The 2009 International Evaluation Group ascertains that the FIOH has been radically transformed to better cover the needs of occupational health in Finland in the future. Most of the recommendations of the 2004 evaluation have successfully been put into effect. The process of transformation is not complete in 2009 and, therefore, some of the effects of changes are not yet visible. The present evaluation should be followed up within a minimum of at least five years but possibly even earlier.

The International Evaluation Group (IEG) finds that the FIOH is poised to contribute to addressing the central critical issue of the economic productivity of Finland. While the country is in the upper echelon of nations in terms of productivity, it will be increasingly more difficult to raise productivity faster than other industrialized countries in the future. Productivity is at the core of Finland's viability and well-being, relying on the health of the country's economic structure and workforce. Labour productivity is affected by an ageing workforce and decreased time at work. The IEG concludes that the FIOH has effectively reorganized to focus on these critical issues, empowering staff, workers and employers to take action and to aid the decisions of various governmental authorities to improve productivity and well-being at work.

The Finnish Institute of Occupational Health is an established name as one of the world-leading institutes of occupational health. It has maintained and even reinforced this prominent position after the reorganization. The reorganization of the FIOH is driven by seven Strategic Goals that address the needs of the MSAH and the nation. The means for achieving these goals is the development of a new organizational structure. From being a traditional hierarchy, the FIOH has now changed into a matrix organization, composed of Centres of Expertise and directed by the Strategic Goals. The Centres of Expertise are organized in teams. In addition, the FIOH has established innovative organizational entities, Units of Excellence and Thematic areas, based on internal excellence as well as societal needs. The FIOH is commended for its new and innovative organization, which increases the ability of the FIOH to pursue the needs of Finnish working life.

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The Strategic Goals of the FIOH are: *(1) The management of occupational health hazards at work as part of management practices and corporate risk management; (2) Innovative, regenerative and healthy work communities; (3) Each citizen equipped to ensure his or her occupational safety and well-being; (4) Providing authorities with information for promoting occupational safety and health; (5) Smoothly flowing work processes, safe and easy to use working methods and tools; (6) Solutions for increasing participation in working life; (7) Controlling new occupational hazards, exploiting new opportunities*. All of the Strategic Goals are relevant, are based on the contract with the Ministry of Social Affairs and Health, and are being pursued with vigour by the FIOH. The International Evaluation Group commends the high standard of the work in relation to the Strategic Goals.

The client services of the FIOH are important, as they may be solely responsible for certain functions in Finnish Occupational Health as well as being a link between requirements for new knowledge in Finnish working life and research at the FIOH. Important results in the field of occupational health and safety have been produced that are used not only at national but also European and international levels. The work of the FIOH also contributes to the development of legislation, good practices, and standards. This is highly commendable.

The Regional Offices of the FIOH have been better integrated in the Institute at large after the reorganization. The FIOH is encouraged to reinforce information and communication technology to decrease the need for physical travel and increase frequent quality contacts. The Regional Offices are important hubs for contact between the FIOH and enterprises in Finland and Regional Advisory Groups are important not only for the Regional Offices but also for the FIOH at large. Many of the client services are performed through the Regional Offices but are coordinated nationally following the reorganization.

The international role of the FIOH is prominent and is valued by partners in the European Union (EU), the World Health Organization (WHO), the International Labour Organization (ILO), developed and developing countries. Finland’s international standing is reinforced by these activities.

In the general strategy of the FIOH, the *Innovation Chain* is a key component. The innovation chain is a way to conceptualize the process from research, via innovation to actual benefit for society. Through this concept, the FIOH is successful in the implementation of new knowledge in working life. The IEG commends the concept of the innovation chain and suggests even further reinforcement of research on the implementation process and evaluation of the impact of interventions.

The FIOH has a number of partners in the goal to improve occupational health in particular and the health of the working population in general. The IEG encourages further increases in partnerships.

The IEG is impressed by the FIOH as such and by the transformation process as it now stands. Some recommendations are provided by the IEG to the FIOH to assist the Institute to further reinforce itself. Having such a powerful knowledge centre in occupational health is a great competitive advantage for Finland and an asset to the occupational health of the world. The IEG concludes that the Finnish Institute of Occupational Health has undertaken a successful transformation in accordance with the needs of society. This places the FIOH in a strategic position to address the future needs of working life in Finland.

Key words : comparative research, evaluation, international comparison, occupational health, reports, working life

Tiivistelmä

Göran Bondjers, Paulien Bongers, Marilyn Fingerhut, Timo Kauppinen, Stavroula Leka, Paul Schulte, Vappu Taipale, Hannu Uusitalo. Kohti parempaa työelämää. Työterveyslaitoksen kansainvälinen arviointi, 2009.

Sosiaali- ja terveysministeriön hallinnonalalla toimivaa Työterveyslaitosta (TTL) arvostetaan suuresti sekä kansallisesti että kansainvälisesti työterveysalan johtava laitoksena. Tämä muistio käsittää tieteellisistä asiantuntijoista[2] koostuvan kansainvälisen arviointiryhmän (International Evaluation Group) suorittaman arvioinnin, jonka ministeriö tilasi laitoksen toimintapolitiikan tarkoituksenmukaisuuden ja innovaatioketjun arvioimiseksi. Vuoden 2009 arviointiryhmä toteaa, että Työterveyslaitosta on uudistettu perinpohjaisesti, jotta se voisi vastata tulevaisuudessa paremmin työterveyteen liittyviin tarpeisiin. Useimmat vuoden 2004 suosituksista on toteutettu onnistuneesti. Muutosprosessia ei ole vielä saatettu loppuun vuonna 2009, ja tästä syystä kaikki muutosten vaikutukset eivät ole tällä hetkellä nähtävissä. Tämä arviointi tulisi suorittaa uudelleen vähintään viiden vuoden sisällä tai mahdollisesti jo aiemmin.

Kansainvälinen arviointiryhmä katsoo, että Työterveyslaitos on valmis omalta osaltaan tarttumaan taloudellista tuottavuutta koskevaan keskeiseen kysymykseen. Samalla kun Suomi tuottavuutensa puolesta kuuluu vahvimpien kansakuntien joukkoon, sen on tulevaisuudessa yhä vaikeampaa nostaa tuottavuuttaan muita teollistuneita maita nopeammin. Suomessa tuottavuus on elinvoimaisuuden ja hyvinvoinnin ydinkysymys, joka nojaa maan terveeseen taloudelliseen rakenteeseen ja työvoimaan. Työn tuottavuuteen vaikuttaa ikääntyvä työvoima ja vähentynyt työssäoloaika. Arviointiryhmän johtopäätös on, että Työterveyslaitos on tehokkaasti järjestänyt toimintansa uudelleen pystyäkseen panostamaan näihin tärkeisiin kysymyksin, niin että henkilöstö, työntekijät ja työnantajat voisivat ryhtyä toimiin ja myötävaikuttaa eri viranomaisten päätöksiin tuottavuuden ja työhyvinvoinnin lisäämiseksi.

Suomen Työterveyslaitos tunnetaan yhtenä maailman johtavista työterveysalan laitoksista. Se on uudelleenjärjestelyjen myötä säilyttänyt tämän tunnustetun asemaansa ja jopa vahvistanut sitä. Uudistus perustuu seitsemään strategiseen tavoitteeseen, jotka on määritelty sosiaali- ja terveysministeriön ja kansakunnan tarpeita vastaavasti. Tavoitteiden saavuttamisen välineenä on uuden rakenteen kehittäminen laitokselle. Sen rakenne oli aikaisemmin hierarkkinen, mutta nyt se on muuttunut matriisiorganisaatioksi, joka koostuu osaamiskeskuksista ja jota ohjaavat strategiset tavoitteet. Osaamiskeskukset on organisoitu tiimeiksi. Lisäksi on luotu innovatiivisia organisaatiokokonaisuuksia, osaamisyksiköitä ja temaattisia alueita, jotka perustuvat sisäiseen osaamiseen ja yhteiskunnallisiin tarpeisiin. Työterveyslaitosta on kiitelty sen uudesta ja innovatiivisesta organisaatiosta, joka edistää sen kykyä vastata Suomen työelämän tarpeisiin.

Työterveyslaitoksen strategiset tavoitteet ovat: *(1) työterveyteen liittyvien vaarojen hallinta osana johtamiskäytäntöjä ja kokonaisvaltaista riskienhallintaa, (2) innovatiivinen, uudistuva ja terve työyhteisö, (3) jokainen kansalainen on kykenevä varmistamaan oman työnsä*

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turvallisuuden ja työhyvinvointinsa, (4) viranomaisille annetaan tietoa, jonka avulla he voivat edistää työsuojelua ja työterveyttä, (5) joustavat työprosessit, turvalliset ja helppokäyttöiset työmenetelmät ja -välineet, (6) ratkaisut työelämään osallistumisen lisäämiseksi sekä (7) uusien työhön liittyvien vaarojen hallinta, uusien mahdollisuuksien hyväksikäyttö. Kaikki nämä strategiset tavoitteet ovat olennaisen tärkeitä ja perustuvat sosiaali- ja terveysministeriön kanssa tehtyyn sopimukseen. Työterveyslaitos pyrkii toteuttamaan ne kaikella tarmollaan. Kansainvälinen arviointiryhmä kiittää työn korkeaa laatua suhteessa strategisiin tavoitteisiin.

Työterveyslaitoksen asiakaspalvelut ovat tärkeitä, sillä ne saattavat olla yksin vastuussa eräistä työterveyteen liittyvistä tehtävistä; lisäksi ne toimivat linkkinä työelämän uutta tietoa koskevien vaatimusten ja laitoksen tutkimuksen välillä. Työsuojelun alalla on saavutettu tärkeitä tuloksia, joita käytetään hyväksi paitsi kansallisella myös Euroopan ja kansainvälisellä tasolla. Työterveyslaitoksen työ vaikuttaa myös lainsäädännön, hyvien käytäntöjen ja standardien kehittämiseen. Tämä ansaitsee suuren kiitoksen.

Työterveyslaitoksen aluetoimistot ovat uudelleenorganisoinnin tuloksena yleensä ottaen integroituneet paremmin TTL:ään. Työterveyslaitosta kannustetaan vahvistamaan tiedotus- ja viestintätekniikkaansa, jotta voitaisiin vähentää tarvetta matkustamiseen sekä lisätä usein toistuvia laatukontakteja. Aluetoimistot ovat TTL:n ja Suomessa toimivien yritysten tärkeitä kontaktikeskuksia, ja alueelliset neuvottelukunnat eivät ole tärkeitä ainoastaan aluetoimistoille vaan myös Työterveyslaitokselle yleensä. Monia asiakaspalveluista tarjotaan aluetoimistojen kautta, mutta uudelleenjärjestelyjen myötä niitä sovitetaan yhteen kansallisesti.

Työterveyslaitoksen kansainvälinen asema on näkyvä, ja Euroopan unionin, Maailman terveysjärjestön (WHO), Kansainvälisen työjärjestön (ILO) sekä kehittyneiden ja kehitysmaiden yhteistyökumppanit arvostavat sitä. Laitoksen toiminta vahvistaa Suomen kansainvälistä mainetta.

Työterveyslaitoksen yleisstrategiassa *innovaatioketju* on erityisen tärkeä elementti. Innovaatioketju on tapa havainnollistaa prosessia tutkimuksesta innovaation kautta siitä yhteiskunnalle koituvaan varsinaiseen hyötyyn. Tämän käsitteen avulla Työterveyslaitos soveltaa onnistuneesti uutta tietoa työelämässä. Arviointiryhmä kiittelee innovaatioketjukäsitettä ja esittää toteuttamisprosessin ja interventioiden vaikutuksen arviointia koskevan tutkimuksen edelleen vahvistamista.

Työterveyslaitoksella on useita yhteistyökumppaneita sen toimiessa erityisesti työterveyden ja koko työtä tekevän väestön terveyden parantamiseksi. Arviointiryhmä kannustaa edelleen lisäämään kumppanuuksia.

Työterveyslaitos on jo sinänsä sekä nykyisen muutosprosessinsa ansiosta tehnyt suuren vaikutuksen arviointiryhmään. Ryhmä on antanut joitakin suosituksia, joiden toteuttaminen auttaisi laitosta edelleen vahvistamaan itseään. Tällaisella voimakkaalla työterveysalan tietokeskuksella on Suomelle suuri kilpailullinen merkitys, ja se on myös maailmanlaajuisesti hyvä asia työterveyden näkökulmasta. Arviointiryhmän johtopäätös on, että Työterveyslaitos on onnistuneesti muuttanut toimintaansa ja organisaatiotaan yhteiskunnan tarpeiden mukaisesti. Tämä asettaa sen strategisesti tärkeään asemaan vastattaessa Suomen työelämän tulevaisuuden tarpeisiin.

Asiasanat: arviointi, kansainvälinen vertailu, raportit, työelämä, työterveys, vertaileva tutkimus

Resumé

Göran Bondjers, Paulien Bongers, Marilyn Fingerhut, Timo Kauppinen, Stavroula Leka, Paul Schulte, Vappu Taipale, Hannu Uusitalo. På väg mot ett bättre arbetsliv. Internationell utvärdering av Institutet för arbetshygien, 2009.

Arbetshälsoinstitutet, som fungerar inom social- och hälsovårdsministeriets förvaltningsområde, värderas högt såväl nationellt som internationellt som ett ledande institut inom området för arbetshälsa. Denna rapport inbegriper en utvärdering som utförts av en internationell evalueringsgrupp (International Evaluation Group) bestående av vetenskapliga experter [3] som ministeriet beställt för att bedöma relevansen av institutets verksamhetspolitik och dess innovationskedja. Evalueringsgruppen för 2009 konstaterar att Arbetshälsoinstitutet har omorganiserats på ett genomgripande sätt för att det ska kunna bättre svara på behov som anknyter till arbetshälsan i Finland. De flesta av rekommendationerna från år 2004 har genomförts på ett lyckat sätt. Ändringsprocessen är inte slutförd år 2009, och därför kan man ännu inte se alla dess effekter. Denna utvärdering bör upprepas inom minst fem år eller redan tidigare.

Den internationella evalueringsgruppen anser att Arbetshälsoinstitutet för sin del är berett att ta itu med den centrala frågan om ekonomisk produktivitet i Finland. Samtidigt som landet i fråga om sin produktivitet räknas bland de starkaste nationerna i världen, har det i framtiden allt svårare att höja sin produktivitet snabbare är de andra industrialiserade länderna. I Finland är produktivitet en kärnfråga när det gäller välbefinnande och välfärd, och den baserar sig på landets sunda ekonomiska struktur och friska arbetskraft. Arbetets produktivitet påverkas av den åldrande arbetskraften och det faktum att den stannar kortare tid i arbetslivet. Evalueringsgruppens slutsats är att Arbetshälsoinstitutet har omorganiserats effektivt för att det ska kunna satsa på dessa viktiga frågor, så att personalen, arbetstagarna och arbetsgivarna kan vidta åtgärder och medverka till olika myndigheters beslut för att öka produktivitet och välbefinnande i arbetet.

Det finska Arbetshälsoinstitutet är ett etablerat namn som en av världens ledande institutioner inom området för arbetshälsa. I och med omorganiseringen har det bibehållit och även stärkt sin uppskattade ställning. Reformen baserar sig på sju strategiska mål, som definierats enligt social- och hälsovårdsministeriets och nationens behov. Ett medel för att uppnå målen är att utveckla en ny struktur för institutet. Dess struktur har traditionellt varit hierarkisk men nu har det blivit en matrisorganisation som består av kompetenscentrum och som styrs av strategiska mål. Kompetenscentrumen har organiserats i arbetslag. Därutöver har man skapat innovativa organisationshelheter, kompetensenheter och tematiska områden som baserar sig på intern kompetens och samhälleliga behov. Arbetshälsoinstitutet har prisats för sin nya och innovativa organisation, som bidrar till dess förmåga att möta arbetslivets behov.

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Arbetshälsoinstitutets strategiska mål är: *1) hantering av arbetshälsorisker som en del av ledningspraxis och helhetsbetonad riskhantering, 2) en innovativ och sund arbetsgemenskap som är kapabel att förnya sig, 3) alla medborgare ska kunna säkerställa att deras arbete är tryggt samt välbefinnande i arbetet, 4) myndigheterna ska ges information med vilken de kan främja arbetarskyddet och hälsan i arbetet, 5) smidiga arbetsprocesser samt trygga och lätta arbetsmetoder och arbetsredskap, 6) lösningar som ökar deltagandet i arbetslivet samt 7) hantering av nya faror i samband med arbetet, att man utnyttjar nya möjligheter.* Alla dessa strategiska mål är relevanta och baserar sig på ett avtal med social- och hälsovårdsministeriet, och Arbetshälsoinstitutet strävar efter att uppnå dem med all sin energi. Den internationella evalueringsgruppen prisar arbetets höga kvalitet i förhållande till de strategiska målen.

Arbetshälsoinstitutets klientservice är viktig för det kan vara så att den ensamt ansvarar för vissa funktioner förknippade med arbetshälsan och för att den fungerar som en länk mellan kraven på ny kunskap för arbetslivet och institutets forskning. Man har nått viktiga resultat inom området för arbetshälsa, och dessa utnyttjas inte enbart på det nationella utan även på det europeiska och internationella planet. Arbetshälsoinstitutets arbete medverkar även till utvecklandet av lagstiftningen, bästa praxis och standarder. Detta är berömvärt.

Regionbyråerna har till följd av omorganiseringen bättre integrerats i Arbetshälsoinstitutet. Institutet uppmuntras att förstärka sin kommunikationsteknologi i syfte att minska behovet av arbetsresor och öka kvalitetskontakter. Regionbyråerna utgör viktiga kontaktpunkter för Arbetshälsoinstitutet och företag i Finland, och de regionala delegationerna är inte enbart viktiga för regionbyråerna utan även för Arbetshälsoinstitutet som en helhet. Flera typer av klientservice erbjuds genom regionbyråerna, men i och med omorganiseringen samordnas de nu på det nationella planet.

Arbetshälsoinstitutets internationella ställning är prominent, och samarbetspartner inom Europeiska unionen, Världshälsoorganisationen (WHO), Internationella arbetsorganisationen (ILO) och i utvecklade och utvecklingsländer uppskattar det. Institutets verksamhet förstärker Finlands internationella anseende i detta avseende.

Innovationskedjan utgör ett viktigt element i Arbetshälsoinstitutets allmänna strategi. Innovationskedjan är ett sätt att åskådliggöra processen från forskning via innovation till dess egentliga nytta för samhället. Med hjälp av detta begrepp tillämpar Arbetshälsoinstitutet på ett lyckat sätt ny information i arbetslivet. Evalueringsgruppen berömmer begreppet innovationskedja och föreslår att institutet ska ytterligare stärka sin forskning kring genomförandeprocessens och interventionernas inverkan.

Arbetshälsoinstitutet har flera samarbetspartner när det arbetar för att förbättra i synnerhet arbetshälsan och hälsan för hela den arbetande befolkningen. Evalueringsgruppen uppmuntrar institutet att öka dessa partnerskap.

Arbetshälsoinstitutet har redan som sådant och tack vare ändringsprocessen gjort ett djupt intryck på evalueringsgruppen. Gruppen har utfärdat ett antal rekommendationer med hjälp av vilka institutet ytterligare kan stärka sin roll. Ett så här starkt kunskapscentrum inom området för arbetshälsa ger Finland en stor konkurrensmässig fördel, och det är också en fördel för arbetshälsofrågan globalt. Evalueringsgruppens slutsats är att Arbetshälsoinstitutet har lyckats omorganisera sin verksamhet enligt samhällets behov. Detta innebär en strategiskt viktig ställning när det gäller att svara på olika behov i arbetslivet i Finland.

Nyckelord: arbetshälsa, arbetsliv, internationell jämförelse, komparativ forskning, rapporter, utvärdering

Contents

In addition to the Base Report, six Special Reports were produced by FIOH experts for the purposes of the evaluation. These reports are available at FIOH's web-pages www.ttl.fi/arviointi2009**,** www.ttl.fi/utvardering2009, www.ttl.fi/evaluation2009

List of abbreviations

AWM	Accessible Workplace Method
EU	European Union
FIOH	Finnish Institute of Occupational Health
HR	Human Resources
ICOH	International Commission on Occupational Health
ICT	Information and Communication Technologies
IEG	International Evaluation Group
ILO	International Labour Organization
IT	Information Technology
JOTI	The FIOH's resource planning application
KASTE	National Development Plan for Social and Health Care Services
Kunta 10	A study conducted by the FIOH, in which the impact of changes in the psychosocial work environment was investigated on the health of municipal employees.
MAINE	A survey that measures the FIOH's image among its interest groups. The survey is conducted every three years in cooperation with the MSAH.
MONIKKO	A research- and development project on workplace equality and diversity.
MSAH	Ministry of Social Affairs and Health
OD	Organizational Development
OHS	Occupational Health Services
OSH	Occupational Safety and Health
PARAS	National project to restructure municipalities and services
ParTy	The FIOH's aptitude assessment and a working climate survey
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals regulations
EUROSHNET	Occupational Safety and Health Network
SMEs	Small and Medium-sized Enterprises
Tekes	Finnish Funding Agency for Technology and Innovation
THL	National Institute for Health and Welfare
TYÖTIE	A workplace well-being project which aims to create an internal proactive operating model for successful returns to work after long sick leaves (vocational rehabilitation and prevention of permanent disability pensions) in cooperation with occupational health care.
VTT	Technical Research Centre of Finland
WHO	World Health Organization

1 Introduction

An International Evaluation Group (IEG) of scientists was asked by the Ministry of Social Affairs and Health (MSAH) to evaluate the Finnish Institute of Occupational Health (FIOH). The task of the IEG was to assess how the FIOH has succeeded in implementing its mission regarding modern working life. The evaluation mandate has focused on the FIOH's policy relevance and on the efficiency of its innovation chain. The mandate of the evaluation asks the IEG a number of specific questions. The Scope of the evaluation was defined by the MSAH as:

1. Is there policy relevance (responding to the strategy of the MSAH) of the FIOH's strategy and results ("mission effectiveness")
2. Is the innovation chain efficient and is the quality in producing, disseminating and implementing of knowledge and expertise high.

The objects of the evaluation were defined by the MSAH as:

1. Policy relevance and results

a) Have the Strategic Goals and allocation of resources of the FIOH been in accordance with its legislative mandate and the relevant strategic objectives set by the Ministry of Social Affairs and Health?

b) Have the policy relevance and customer results of the FIOH been adequate and applicable in respect of the needs of the FIOH's customers?

c) Are the Strategic Goals of the FIOH adequate?
- in respect of the role of other R&D institutions, universities and mediating bodies?
- in view of the future needs of Finnish working life?

2. Operational efficiency in innovations and quality

a) Are the FIOH's processes and practices appropriate, innovative and efficient in acquiring information of customer needs?

b) Are the FIOH's processes and practices innovative, of good quality and efficient in R&D? Is the FIOH's role appropriate in relation to other agents in the field and does the FIOH make good use of partnerships?

c) Are the FIOH's processes and practices innovative, appropriate and efficient in disseminating outputs to customers? Is the FIOH's role appropriate in relation to other agents in the field and does the FIOH make good use of partnerships?

d) Are the knowledge and competence of the FIOH and its personnel adequate and sufficient for the current and forthcoming needs in respect to comprehension, coverage and level of knowledge and competence?

The 2009 evaluation of the FIOH is taking place during a global financial and economic crisis, affecting the working life of millions of people. Finland is profoundly affected by the situation, and the expertise of the FIOH is needed more now than it has been during times of growth. Because the country experienced a deep economic recession in the early 1990's and recovered quite well, there may also be lessons learned on how to alleviate hardships that include how to keep the labour force and working life on track for positive development.

Apart from the problems created by the financial crisis, Finland is also facing a demographic crisis as one of the countries with a work force ageing more rapidly than its competitors.

As a basis for the evaluation, the FIOH produced an excellent internal report, the Base Report, which is added as an appendix to the report by the IEG. The programme for the evaluation was decided together with the commissioning bodies. Likewise, the persons to be interviewed were defined by the FIOH but after requests from the IEG. The IEG met representatives for the MSAH, the FIOH Board of Directors, the FIOH Executive Committee, a number of collaborating organizations, employees of the FIOH, and various FIOH customers. Members of the IEG visited local offices in Helsinki, Kuopio, Lappeenranta, Oulu, Tampere, and Turku. Interviews were performed as groups and individually, with the major impressions from the interviews summarized at the end of each day of the interview process. In addition, various additional documents were compiled by the FIOH and presented to the IEG. The IEG requested further documentation, which was provided during the evaluation.

This report is structured based on requests from the MSAH, starting with a general review, continuing with the Strategic Goals and the relations between Strategic Goals and the organization of the FIOH. The operational efficiency of client services and Regional Offices will then be discussed in relation to Strategic Goals. For each section, some recommendations for further development of the activities are provided.

2 General review of the Finnish Institute of Occupational Health

The Finnish Institute of Occupational Health (FIOH) is a leading international institution within its field of expertise. There have been previous international evaluations, in particular the 2004-2005 evaluation, which has lead to profound changes in the strategy and organization of the FIOH. It might be argued that this process has not yet settled and that the present evaluation may have come too soon. Therefore, the present evaluation might be considered intermediary to be followed within the next five years or so by another evaluation.

The FIOH was established as an independent organization by the Foundation for Occupational Health, subsidiary to the parties of the labour market. For 30 years it has been an organization under the administration of the Ministry of Social Affairs and Health (MSAH). Today 58 % of the budgeted costs are covered by government funding. Obviously this arrangement provides a sound basis for the economy of the FIOH. However, as the FIOH is part of the administrative organization of the government, it is also subject to general economy and reorganization measures. Thus, there are requirements according to the government productivity plan that the number of employees at the FIOH should be reduced, not only during the present period of planning but also during the following. This is logical as far as the government grant to the FIOH is concerned, but apparently it also involves external grants and incomes from client services. This implies that the FIOH cannot accept new assignments even if they are financed from external parties. To the IEG this does not appear to be very logical and even uneconomical. The government should consider the possibility of exempting externally financed activities from the government productivity plan. Alternatively, the FIOH might consider establishing an independent unit for external activity. This would however be an inferior alternative, as the direct contact between services and knowledge production would be severed.

The IEG was impressed by the political statement in the Prime Minister's government policy declaration in relation to health in general. Obviously, Finnish ambitions in the area are high. The ambitions also are paralleled by actual achievements in public health in general and occupational health in particular. The role of occupational health in the competitiveness of Finland is recognized. Therefore, it is not surprising that Finland is a leading country in occupational health, both in knowledge production and actual practical work. However, there might be aspects that need further efforts. One example of that may be the question on how to optimize working conditions for older workers. Another example might be the integration of new inhabitants to Finland into productive work. The demographic changes in countries like Finland necessitate the recruitment of professionals from other countries. The FIOH could provide a knowledge base both concerning the needs of the elderly and those of migrants but the actual changes have to be achieved through political efforts. The FIOH already has several projects in relation to the elderly at work, but should establish more projects in relation to migrants. It is important that such projects focus on the needs both of refugees and of labour immigrants.

The Ministry of Social Affairs and Health has set a number of detailed targets for the FIOH. They are related to the Strategic Goals of the Institute and are all very important for Finnish society. However, it may be questioned whether the FIOH, by its own efforts, has the capacity to achieve these targets. In some cases more general trends in society would override any possible efforts by the FIOH. A good example of this is the target to make working life a more attractive prospect and therefore increase the age of retirement. The present financial crisis obviously has more of an impact than any of the efforts made by the FIOH. In other cases it may be that insufficient knowledge precludes any practical proposals by the FIOH. An example of this is the target to decrease differences in the state of health between socioeconomic groups. Apart from the existence of differences in health in relation to socioeconomic state, the scientific knowledge regarding reasons for well documented effects on health is yet scarce. Therefore, a more immediate target would be more realistic such as performing research to explain the causes for the effects of socioeconomic status on health. Whereas we understand the need to define targets on a societal level, we would argue that in combination with these long term targets, short term targets, more specifically addressing the role of the FIOH, are more rewarding.

The expert role of the FIOH in relation to the government is essential. The IEG concludes that the possibilities for the FIOH to contribute to the knowledge support of the Ministry are improved by the new organization, where the Strategic Goals of the FIOH are coordinated with societal ambitions. Many of the targets set by the Ministry can be achieved only through political decisions. The performance agreements between the Ministry and the FIOH have a number of ambitious targets of rather general character. The actual possibilities for the FIOH to contribute to those targets could potentially be analysed in more detail, with detailed targets set accordingly. The role of the FIOH in relation to Finland from an international perspective is a great asset to the country.

The IEG would argue that occupational health is an area of knowledge which requires a special type of organization. Traditionally, much of the knowledge production has taken place at universities. This is particularly true for disciplinarily oriented knowledge productions, such as mathematics, philosophy and other established academic subjects. In recent decades, though, more knowledge production has been made in a context coupled to various external actors. Also, several academic disciplines have to be involved in this development of knowledge production in an area such as occupational health. This requires a new mode of

knowledge production different from that of universities. In universities, research questions are defined by academic disciplines internally. In the new mode of knowledge production research questions are defined by context. These problems are discussed by the FIOH in the Base Report. It has been suggested that the most innovative research done today requires interdisciplinary knowledge production. This is reflected by the FIOH's new organization. Sector institutes through their modes of operation are more suitable for modern knowledge production, as they are defined by the context in which they work. At the FIOH, knowledge production is also connected with practical work in occupational health. Thus, innovations can be put into practice and evaluated in a more practical context. Therefore, the context of knowledge production at the FIOH is defined by the clients and partners as well as by the Institute itself. In some countries, sector institutes have been phased out with the expectation that their responsibilities should be carried out by universities. In occupational health that expectation has failed and therefore, the IEG would like to congratulate Finland for its maintenance of the FIOH and its continued focus on knowledge production in the area of occupational health.

As discussed above, the FIOH is internationally recognized as one of the leading centres for research in occupational health. This view is supported by the bibliometric analysis presented to the IEG. It was argued by a number of interviewees that this is not realistic, in view of the fact that Finland is a small country. The IEG would argue the opposite is true. In view of the significance for individuals, as well as society at large, of the workplace, occupational health should be reinforced in most other countries. Finland should be proud of the FIOH and recognize that the quality of the FIOH and its activities provides a competitive advantage for the country. It is therefore important that the FIOH safeguards and continues to enhance the specific aspects of research that make it valuable to Finnish society, companies and organizations that benefit optimally from this research. These aspects are defined by the Strategic Goals and demand-driven nature of the research questions along with the connection regarding occupational health research to other areas of research relevant to Finnish working life.

On the Board of Directors of the FIOH, three interest groups are represented: the government, the trade unions and the employers. The representation of the parties of the labour market is valuable for the credibility of the FIOH and allows for the possibility to expose the FIOH to different roles and interests in the labour market. Most Board decisions are made unanimously and conflicting views are resolved in seminars outside of the board room. This is a great asset to the FIOH and its role in promoting better occupational health. The expectations on the FIOH vary between labour market organizations. This is not surprising in view of the roles of employers versus employees in working life. The IEG recommends that the FIOH conduct a survey among labour market parties to establish their respective expectations and plan the activities accordingly to further reinforce the credibility of the FIOH.

The FIOH has transformed its organization into a matrix striving to reach seven Strategic Goals, the pursuit of which should yield generations of healthy, productive, and innovative Finnish workers. Leadership in relation to the Strategic Goals is provided by the heads of the FIOH's Centres of Expertise, implying that the two dimensions of the matrix structure are connected on an individual level. At present, this organization appears to function properly, but in a longer perspective it might be necessary to separate the functions as leader for the Centres of Expertise from those responsible for Strategic Goals. The Strategic Goals were developed in response to broad national input that identified the key needs of FIOH clients. The seven Strategic Goals transform the individual 2004 IEG recommendations into a

coherent, institutional system that faces the future with strong science and relevant partnerships to address the current and future needs of Finnish working life. Key 2004 recommendations embraced in the institutional changes were the need to focus on relevant working life problems, to improve the (intervention) effectiveness of the FIOH, and to make decisions in partnership with clients, social partners, workplaces, authorities and other experts.

Work by FIOH leaders and staff led to the creation of 22 strategic programmes to execute the seven Strategic Goals and to achieve societal results (Table 3.1 of the Base Report). The strategic programmes produce or collect needed research, develop relevant products, and transfer results into practice in cooperation with external partners and workplaces. This approach responds to the 2004 IEG recommendations to better transfer research into practice in workplaces and to achieve and evaluate impact. Evaluation of effectiveness of interventions to reduce illness and injury and to enhance working life is a critical need of society that will continue to be prevalent in the future.

The FIOH created a new organizational structure to carry out the 22 strategic programmes. As discussed above, the structures implement specific recommendations of the 2004 IEG. The change in the organizational structure of the FIOH seems to be well adapted to the requirements of modern knowledge production. The matrix structure simplifies the task of establishing multidisciplinary teams. In addition, the coordination of research with actual client work could be expected to increase the awareness of requirements in the practical work environment. Therefore, research directions should be influenced by the actual concrete problems in the work environment. This is a valuable aspect of the matrix structure of the FIOH. A problem might be that it is difficult for the individual employee to define his/her allegiances to team/geographical locations or Strategic Goal. This was also mentioned by some employees of the FIOH stating that it was an advantage if there were at least two individuals working in the same strategic project in a given team. Nevertheless, most of the interviewees had a positive attitude to the new organization and were willing to accept increased bureaucracy in effort to obtain contacts in the matrix. The complete transformation from a traditional hierarchical structure to a matrix structure could however not be immediately expected. Thus, we were given the impression that whereas many of the employees identified with their teams and Centres of Expertise they identified less clearly with the Strategic Goals. A key question for the matrix organization in the FIOH under these conditions is the selection of strategic projects, thematic areas, Units of Excellence and the role of these entities in the matrix. It appeared particularly sensitive to define and select the Units of Excellence in relation to the matrix structure, to avoid the possibility that these entities could become isolated from the matrix functions. The Units of Excellence were selected after an internal process involving an announcement, letter of intent, evaluation by internal review, modification of the proposal according to the needs defined by the Strategic Goals. However, even though this was an internal process, the selection was not questioned by any of the employees that the IEG met with. Neither did the Board of Directors question these selections. As thematic areas and the Units of Excellence are time limited it is essential to consider both the processes of defining new thematic areas and the Units of Excellence and to plan for the phasing out of old ones. Otherwise thematic areas and Units of Excellence might both stagnate and the achievements might not be tended to.

The Strategic Goals represent important areas of occupational health, and as such the IEG supports each of them individually. However, they are rather broad and therefore tend to

overlap to some extent. This may not be a major problem if the Executive committee is aware of the problem and integrates the various projects related to the different Strategic Goals.

Changes in organizational structure and working habits of the FIOH are profound and wide-ranging. Such a process is demanding for all employees. Insecurity in relation to the new organization could potentially be found in relation to personal roles, future tasks, social interactions and a number of other aspects. In view of this, we were positively surprised about attitudes in relation to the changes as reported by the staff that we interviewed. Obviously, most of the employees felt that they had been included in the processes. On the other hand, a personal connection to the Strategic Goals of the FIOH did not appear very evident among employees at the basic level. They appeared to identify with their team and possibly Centre of Expertise rather than with Strategic Goals and the FIOH at large. Nevertheless, it is our view that the process has been conducted with great professionalism and skill. The clients also experienced surprisingly few problems during the changes made in the FIOH. The transformation of the FIOH is a process which could be expected to take a considerable amount of time. Not only have a number of disciplines been integrated into Centres of Expertise, but the change from a hierarchical organization to a matrix organization is a process which also requires considerable time. The IEG is concerned that the present evaluation might be too early to adequately cover all potential benefits as well as potential problems. A problem during the reorganization is the effects made upon the workload of the staff. It was no surprise that the actual workload could not be optimally distributed in the early phases of reorganization. The IEG is under the impression that the middle-management in the FIOH is particularly vulnerable to this issue and should be monitored carefully for work overload.

A matrix organization requires more contacts, as the individual should interact both vertically and horizontally in the organization. Some of the interviewees described this as a bureaucratic decision process. It is important that the logistics of these contacts are made as efficient as possible. Many of the contacts with the Regional Offices still appear to be maintained by physical travelling. New forms of organization and interaction between specialists have been made possible by developments in information technology. At the same time, such new forms, like the matrix structure, need to use front line information technology. To some extent the FIOH has made efforts to introduce new information and communication technology, such as the possibility for video conferencing between the different geographical units of the Institute. However, we feel that the front line is far ahead of video conferencing and feel that the FIOH should consider other solutions, such as video conferencing via personal computers. It is surprising that the FIOH still does not have a web conference system which would enable much easier contact between various specialists. Recently the introduction of a new software management system was implemented. It is important that this support system stimulates the required behaviour (i.e. forming project teams with the best possible disciplines over teams and Centres of Expertise) and strategic goal orientation. Some employees were of the opinion that this was not currently the case and that the system sometimes hampers such behaviour (i.e. the administration of budget allocation).

The concept of the innovation chain helps conceptually to organize various activities in the FIOH. In modern knowledge production, interaction with clients and partners is a key feature. This is well represented in the innovation *chain*, possible with the pro visa that it rather represents an innovation *cycle*, where needs and solutions continuously would change. In such a cycle or chain, it is obvious that all links have to be effectively supported to enable effective and efficient usage of available resources. The concern of the IEG is that the development of

implementation techniques on a scientific level at this point in time may be weaker than the other links of the chain/cycle. This is a fact also supported by several of the interviewees. In other areas where the evidence base for different actions is established, it has been demonstrated that the techniques for implementation of that knowledge are less well studied. This appears to be the case for the FIOH and occupational health as well. Obviously, major efforts have been made to strengthen this section of the chain/cycle in the FIOH during recent years and the FIOH in comparison appears successful in this regard. Nevertheless, the IEG suggests that even further resources be diverted towards methodological improvements in the implementation aspect of the chain/cycle including methods to evaluate success of interventions in the workplaces. The FIOH might consider establishing a new theme including scientists with a perspective on the implementation and change of technology to be defined both within the organization and recruited from outside the FIOH. The individuals connected to that theme could create knowledge of value for other areas of the welfare system. In addition, the IEG emphasizes that the pre-established path to form partnerships in dissemination of the results should be emphasized. For the FIOH, the connections between research, innovations and services are essential for the usefulness of the Institute.

In relation to client services the FIOH has taken a number of measures to become more efficient. It is obvious that the Regional Offices play a key role in relation to services. To some extent, specialization of the Regional Offices as well as the Central FIOH Office has been implemented for laboratory analyses. Although the specialization meant sending samples away rather than analysing them locally the IEG did not find evidence for any decrease in service quality or efficiency. Some concern was however expressed that the capacity might be strained to its upper limit when it came to analysis. More problematic was the fact that the delays in specialist consultations had increased significantly. The FIOH has made a programme to deal with these problems and it is important that this programme is successful and that delays are brought back to an acceptable level. In some cases the FIOH services appear rather routine in character and with competition from other organizations and enterprises. The IEG suggests that in such cases the FIOH considers taking a step back, concentrating on accreditation, training and development of new services. In relation to services the IEG appreciates the role of various Regional Advisory Groups to monitor needs and possibilities. The possibilities of coordinating the Regional Advisory Groups with national meetings should be exploited and might be a great asset in the future.

The FIOH develops cutting-edge products and new methods working with appropriate partners. The role of the FIOH has been to modify the technology for the needs of occupational health care and to give ideas for the reporting and interpretation of the results. In addition, with the FIOH’s expertise and facilities, it can give added value for many national and international legislations, good practices, standards, and methods. Important results have been achieved in the field of occupational health and safety that can be used not only at national but at European and international levels. The FIOH’s work contributes to the development of legislation, good practices and standards. This is highly commendable.

Contacts with partners are important for an area such as occupational health, where a number of different organizations might be involved. To a very large extent, the partners that the IEG met expressed their appreciation of the FIOH but a few of them also suggested improvements in regards to contacts. It is obvious that such improvements would involve both the FIOH and its partners. It appears that contact with the Labour Inspectorate should be discussed and possibilities for improvement exploited.

The Finnish health policy target has of late been “health in all policies”, which was introduced into the agenda of the European Union during Finland’s presidency in the autumn of 2006. This policy brings the responsibility regarding public health to all sectors. This relates to one of the fundamentals expressed in the Ottawa declaration on health promotion entitled “intersectoral collaboration”. Intersectoral collaboration means that different sectors of society should be involved in the analysis and solution of a problem. This could be the health sector, the social sector, the employment sector or many other sectors. Intersectoral research focuses on the processes involved in collaboration and engages disciplines like political science, economical science and others. The significance of intersectoral collaboration in health as stated in the Ottawa declaration is due to the complex knowledge base of health. This is obviously the case not only in general but also in occupational health in particular. A number of stakeholders are involved in the achievement of health and healthy participation in work. This could be trade unions, employers, national insurance systems, occupational health authorities, workers protection directorate and others. The IEG realizes that research on the interaction between different sectors is not part of the standard agenda in occupational health research, but would suggest that the FIOH establishes competence in research and specialist services in this area. To achieve a high academic status, political and management scientists could form a nucleus of such activities. It would be essential that the activity includes practical work in relation to companies and public administration. Also the representative of the Ministry of Employment and the Economy has emphasized that they could greatly benefit from the knowledge of the FIOH for instance on social innovations.

The turnover of staff in the FIOH will be considerable, as the age of the employees is increasing. It is reassuring that the FIOH has established a programme for renewal of human resources. The recruitment of young collaborators, as well as the maintenance of those already working at the FIOH is a key factor for the future success of the Institute. In view of the complex organization of the FIOH it might be worthwhile to consider an introduction programme to familiarize new employees not only with the hierarchy of Centres of Expertise and teams but also with the Strategic Goals. If such a programme is successful it might also help the older employees to become more aware of the possibilities with the new matrix organization.

Thus, the IEG finds the transformation of the FIOH remarkably successful. This evaluation was performed in a phase where the transformation is not complete, with problems potentially becoming apparent in a later phase. However, at this stage the IEG can only commend the FIOH for what has been achieved thus far and congratulate Finnish society for the quality of its occupational health research, innovation and services.

2.1 Recommendations

1) The performance targets for the FIOH are very general and may reflect the trust put into the FIOH by the MSAH. However, it is obvious that many of the performance targets would involve many other actors as well. The IEG recommends that performance targets for the FIOH, as stated in the agreement with the MSAH are more short-term and achievable by the FIOH’s activities. Qualitative strategic goals might be considered in the next agreement.

2) The FIOH has been very successful in attracting external funds and incomes from services. It does not seem logical that government funds and funds from external sources and services are handled in the same way. The IEG recommends that the external service activity of the FIOH be exempt from the government productivity programme. The IEG has the opinion that the government productivity programme has severe unintended consequences for the FIOH's ability to meet the demand of its services. Therefore, the programme should take into account only that part of the employment which is financed by government grant. However, the FIOH should be aware that in the long run this may have a negative side-effect of increasing financing of external sources to the extent that the FIOH's ability to contribute to the strategy of the Ministry of Social Affairs and Health is endangered.

3) The FIOH appears to be well aware of the significance of occupational health for the individual's health as a whole and the IEG commends the FIOH on its holistic perspective in this regard. Many issues in health are related both to occupation and to the society outside the workplace. Such issues are partly covered at the FIOH and partly at the National Institute for Health and Welfare (THL). The IEG recommends that a strategic plan for the cooperation between the THL and the FIOH is elaborated and agreed upon.

4) The FIOH already has several projects in relation to the elderly at work, and they are important both for the individual and Finnish society. However, these projects could be complemented with more activities in relation to migrants and their involvement in work life. At present the FIOH has a project on equal treatment but there are also other aspects to be covered if equity in relation to cultural background is to be achieved. It is important that such projects focus on the needs both of refugees and of labour immigrants.

5) The FIOH has expertise and programmes on mental health in its different Centres of Expertise. The IEG proposes that the FIOH experts across centres collaborate to achieve greater impact as concerns research and the development of skills and methods for the promotion of mental health at the workplace.

6) It is important for the FIOH to have credibility among the partners in the labour market. The IEG would recommend that the FIOH conducts a survey among labour market parties to establish what expectations they would have on the FIOH in future.

7) The concept of the innovation chain is valuable. However, the implementation of innovations appears to be the weak link in the chain. Therefore, the IEG suggests that the FIOH consider establishing a new unit or theme focusing on implementation research.

8) The FIOH does not appear to have used the full benefits in modern information and communication technology (ICT). The FIOH should increase its infrastructure, ambitions and competence in ICT.

9) The FIOH has rightly identified the retirement of key staff as a priority and also the need to ensure continuity of activities and knowledge (e.g. in relation to key programmes such as entrepreneurs' health). The IEG encourages the FIOH to continue to address the retirement and recruitment issue.

10) The FIOH has taken steps towards staff well-being, among them the introduction of the TYÖTIE programme, and mentoring. The IEG commends the FIOH for the steps taken so far and recommends that the FIOH monitors the effectiveness of the actions taken in order to improve personnel's working ability and prevent long-lasting absenteeism due to sickness or other causes. Staff well-being should continue to be given high attention building on the measures already taken.

11) The FIOH is advised to develop a group responsible for caring for FIOH staff in their continuing adaptation to the new matrix system, so that bureaucratic difficulties are reduced, the quality of work life continues to be enhanced, and the efficiency of productive work continues to be increased. This group should pay special attention to the needs of FIOH staff in the Regional Offices, who express enthusiasm about the integration of the Regional Office staff into a unified FIOH, but note extra hurdles that should be remedied by FIOH leadership.

12) The FIOH should increase its visibility in the Finnish society. There already is good collaboration with different networks in the regions but the services and products available should be marketed more in a businesslike manner.

13) The Aimed Impact Statements developed by the FIOH for each Strategic Goal provide valuable insights into the intent of the Strategic Goal. The IEG recommends expanding beyond Aimed Impact statements to include specific performance measures/indicators of success that can be used in evaluation of impact on health and safety and/or work ability.

14) The FIOH should develop an effort to enhance management of the organization matrix. This effort should focus further on the mechanics involved in accountability, staff recognition, decision-making, and resource allocations.

15) The FIOH should develop a comprehensive plan toward increasing productivity in Finland's workers by prevention of occupational health problems that reduce a worker's ability to function. This plan should focus on ageing workers but also on new workers.

16) Contacts with partners are important for the area of occupational health. Taking into account the importance and size of the labour inspector organization, it would be valuable to develop well-functioning cooperation between the FIOH and the labour inspector organization for development of healthier, safer and better functioning working life in the productive environment.

17) Regional Office reports indicate that in many areas there is more demand for services than Offices can provide. Taking into account high demand on services internal work sharing in the Regional Offices and between the FIOH and Regional Offices should be discussed as well as which of the work could be outsourced or to accredited external partners.

3 Response to the assignments by the Ministry of Social Affairs and Health to the International Evaluation Group

3.1 Objects of the evaluation

1. Policy relevance and results

a) Have the Strategic Goals and allocation of resources of the FIOH been in accordance with its legislative mandate and the relevant strategic objectives set by the Ministry of Social Affairs and Health?

The Strategic Goals and allocation of resources in the FIOH are set according to the legislative mandate of the FIOH. The IEG considers the Strategic Goals to be the operational interpretations of the strategic objectives set by the Ministry. Resources have been distributed accordingly, even if the matrix structure means that the actual resources are initially distributed according to the competence areas within the FIOH. In a later phase of the reorganization of the FIOH, the Institute may consider allocating resources according to strategic goals, i.e. according to external targets defined by the Ministry. At present the actual allocation of resources could be described as an effect of negotiations within the executive committee, and where the individuals are responsible both for competence areas (Centres of Expertise) and strategic goals. Presently, the negotiations appear to lead to a good allocation of resources but in the future, the double roles of the members of the executive committee could lead to problems.

b) Have the policy relevance and customer results of the FIOH been adequate and applicable in respect of the needs of the FIOH's customers:

- authorities
- workplaces
- citizens
- mediating bodies that serve, support or represent workplaces, employees or employers (e.g. occupational health services, occupational safety authorities and organizations, labour market organizations, insurance institutions, health promotion organizations and organizations that train employees or otherwise engage in workplace development)
- public management and development of occupational health and working life in Finland and the European Union?
- collaboration between occupational safety and health

As described in detail in the report, the policy relevance and customer results of the FIOH appear to be relevant and adequate in relation to most customers and partners. The IEG has defined some areas where collaboration could be more efficient. The FIOH should analyze the needs of small and medium-sized enterprises and service enterprises. If necessary, such an analysis might lead to the development of more dedicated programmes for these clients. The IEG considers the interaction with the labour market organizations a cornerstone of the work of the FIOH and may need to communicate with employees and employer's organizations to define the strategic goals of both parties. It is strength of the FIOH that the labour market organizations are represented in the Board of Directors and that all decisions are taken

unanimously. This mode of operations should be treasured in the future. The FIOH should discuss with the labour inspectorate the problems in service delivery that were mentioned by that authority. In relation to the health of the Finnish citizen, both the FIOH and the THL have a responsibility, with partly overlapping groups of stake-holders. The division of work as well as collaborations should be resolved in a strategic discussion. It is important that the training activities of the FIOH in relation to different partners, such as the occupational health, labour inspectorate and many others, continues to be as successful as it is at present. The FIOH is an active and respected research and services partner within the EU.

c) Are the Strategic Goals of the FIOH adequate

- in respect of the role of other R&D institutions, universities and mediating bodies?
- in view of the future needs of Finnish working life?

The Strategic Goals of the FIOH are an adequate means of addressing critical issues in Finland. To some extent the goals will by necessity be overlapping with those of the THL. In relation to the universities the context-related knowledge production of the FIOH is very different. The IEG considers the contact between services, innovation and research as pursued in the FIOH a major asset of the FIOH and impossible to achieve in the university system. Research defined by its context is a characteristic of the new form of knowledge production and alien to the university disciplinary form of research. When it comes to the future needs of Finnish working life the FIOH caters to those needs that are defined at present. The coverage of services may not be total, partly related to the effects of the government productivity plan. The IEG considers the application of this plan to externally financed services in the FIOH counter-productive and actually a threat to the quality of occupational health in the country. The FIOH might want to consider establishing an internal observatory function to foresee new challenges to occupational health.

2. Operational efficiency in innovations and quality

1) Are the FIOH's processes and practices appropriate, innovative and efficient in acquiring information of customer needs?

The integration of services with the research and innovation system is probably the key component in making the Institute sensitive to customer needs. The IEG was given the impression that this integration has been reinforced considerably after the reorganization. In addition, the Regional Advisory Groups are important as carriers of knowledge concerning customer needs. The possibility to establish strategic projects from different teams in different Centres of Expertise facilitates the development of new processes and practices according to perceived needs. The IEG considers the FIOH’s present mode of operation excellent in that regard.

2) Are the FIOH’s processes and practices innovative, of good quality and efficient in R&D? Is the FIOH’s role appropriate in relation to other agents in the field and does the FIOH make good use of partnerships?

The R&D of the FIOH is of excellent quality, in some areas world-leading and definitely very efficient when comparing with other dedicated institutes for occupational health in the world. The FIOH has established partnership with many other research institutions, nationally as

well as internationally. Such partnerships contribute to the remarkably high esteem that the FIOH has globally.

3) Are the FIOH's processes and practices innovative, appropriate and efficient in disseminating outputs to customers? Is the FIOH's role appropriate in relation to other agents in the field and does the FIOH make good use of partnerships?

The concept of the innovation chain is a good expression of the view of the FIOH on the dissemination of new knowledge and services to customers. The importance of implementation of innovations is recognized by the Institute. In comparison with many other similar institutions the FIOH is very successful in disseminating its results to society. Nevertheless, the IEG considers implementation the weakest link in the innovation chain. This may be due to the fact that the implementation process has a relatively weak scientific backing. This is true for implementation in general, for example concerning implementation of evidence based medical treatments, and not a deficiency of the FIOH. If the FIOH was to reinforce the scientific basis of its endeavours in implementation and evaluation and in evaluation of impact this would be of significance for many other areas as well.

4) Are the knowledge and competence of the FIOH and its personnel adequate and sufficient for the current and forthcoming needs in respect to comprehension, coverage and level of knowledge and competence?

The personnel of the FIOH appear to be very dedicated, and the scientific level in general is excellent. It may be weaker though within social sciences, and the IEG would suggest that the FIOH considers recruitment of staff with competence in political and economical science. The Institute needs to be aware of renewal and replacement of staff and should continue to support young collaborators. If possible, temporary positions should be transformed to permanent ones to accommodate and maintain young collaborators.

4 Responsiveness of the Finnish Institute of Occupational Health to the recommendations of the 2004 Evaluation

The 2004 International Evaluation Group (IEG) Report concluded that the FIOH fully deserves its fine reputation as a world and national leader in occupational health and it has been highly productive and successful in implementing its mission to enhance the quality of modern work life and to ensure the safety and health of Finnish working people. The 2004 IEG concluded that the FIOH develops its strategies and activities, within its four core processes of research, information dissemination, service and training, to advance the strategies of the Ministry of Social Affairs and Health. In response to the Ministry request to make future-oriented recommendations, the 2004 IEG Report provided 21 recommendations for the FIOH overall, and about 3 recommendations for each Department and Regional Institute, for a total of 83 recommendations.

The FIOH has, in a relatively short period of time (2004-2006) accomplished a profound reorganization that strengthens its national and international scientific leadership while even better advancing the strategies of the Ministry of Social Affairs and Health, providing even better solutions for client needs, and reaching even more of the working people of Finland. The changes in the Institute were accomplished with broad stakeholder, Ministry and staff

participation. The changes far surpass the hopes of the 2004 IEG, yet the new approaches and structures clearly respond to the suggestions given in the 2004 IEG Report and to the strategic vision of the Ministry of Social Affairs and Health.

The dramatic institutional changes implement fully the 2004 IEG recommendations to improve cross Institute coordination, including the Regional Institutes, and the laboratories throughout the FIOH. The FIOH now is one fully integrated Institute with every staff member belonging to one or more Teams. The laboratories function from the Centre for Work Environment and Development. External client interviewees said they like contacting the entire Institute's expertise instead of the more limited Regional Institute's local expertise. In cases where some staff team members are located in Regional Offices at distances they find it more difficult than Helsinki-based staff to work with their Teams, but report overall feeling more integrated and appreciated in the new structure. The Regional Offices seem to have succeeded in maintaining "esprit de corps" locally while supporting full integration of staff in the Institute.

The 2004 IEG recommendations emphasized the need to transfer research into practice in workplaces, to track the use of FIOH research and products, and to evaluate the impact of interventions on reducing illness and injury. These recommendations are addressed in the approach of the FIOH. For each Strategic Goal and for each Programme carrying out the activities to pursue the goal, details of the "Aimed impact" and of the "Aimed impact process" are described; and the allocation of resources is provided, by assigning dedicated funds to *Research and Development, Information and Communication, Training, and Advisory Services*. This approach integrates the four core processes of the FIOH to address the current and future needs of the workplaces, and provides the needed framework to develop and to assess the usefulness of tools, information and practices. It also provides the data needed to evaluate over future years the impact on reducing illness and injury and on increasing the well-being of working people.

The 2004 IEG noted the valuable tools and information produced by the FIOH and recommended that the FIOH assess the situation to identify products with substantial value to society as well as to specialized areas. The FIOH has undertaken a thorough analysis of client needs, appropriately utilizing surveys and workshops, and has reorganized its service functions for efficiency and meeting of client needs. Seven Product lines (Table 4.2 of the Base Report) have been generated to assist clients with work procedures and arrangements to increase the quality of working life and to prevent health and safety problems. Assessments of usefulness have been introduced, and it is expected that broader evaluations will be undertaken in future years to assess impact on the quality of working life and on reduction of workplace illness and injury.

The 2009 IEG appreciates the short timeframe since the profound changes in the Institute and notes that it is remarkable that the FIOH has made strong progress in addressing almost all of the 21 recommendations made in 2004 for the FIOH overall. The FIOH has made strong progress on most of the recommendations made for specific departments and Regional Institutes. Some of these actions are noted in other sections of this 2009 IEG report.

4.1 Recommendations

18) The 2004 IEG recommended that the FIOH consider sharing information widely, particularly addressing the needs and barriers (e.g. cost) of small enterprises and entrepreneurs. The FIOH is in the process of transforming its website for easy usability and to make information widely available. The 2009 IEG strongly recommends continuing expansion of these efforts to reach this important group constituting a majority of workplaces in Finland. We encourage evaluation of the use and usefulness of information, products, and training, and of the impact on health, safety, and quality of working life.

19) The 2004 IEG identified work overload of dedicated FIOH staff as an issue needing attention. The 2009 review of the FIOH applauds the approach taken by the FIOH first to ascertain and address the needs of clients, while involving FIOH staff in all aspects. It is now appropriate to address this issue in a supportive context. Interviews indicate general approval about the new FIOH, but also a bureaucratic complexity, too many meetings, an unfriendly electronic JOTI management system, and the absence of a FIOH internal advisory group recognized by employees as seeking their views, worries and suggestions. The IEG recommends that the FIOH creates a group to care for the staff needs, to reduce hurdles of functioning in the new matrix organization, and to assist staff to achieve a balanced working life.

5 Relationship between Strategic Goals and organizational structure

In order to reach the Strategic Goals the FIOH has implemented a reorganization. Teams organized in six Centres of Expertise have been formed:

1. Work environment development
2. Good practices and Competence
3. Health and Work Ability
4. Human Factors at Work
5. Work Organizations
6. Internal Services

These Centres of Expertise are more problem-oriented than the previous departments that had a more mono-disciplinary basis. In order to further enhance cooperation between different areas of expertise, responsibility for the seven Strategic Goals is organized horizontally, thus forming a matrix organization. This organization is formed to better suit the more problem-orientated nature of the research and knowledge transfer activities of the FIOH, particularly in relation to the seven Strategic Goals:

1. The management of occupational health hazards at work as part of management practices and corporate risk management
2. Innovative, regenerative and healthy work communities
3. Each citizen equipped to ensure his or her occupational safety and well-being
4. Providing authorities with information for promoting occupational safety and health
5. Smoothly flowing work processes, safe and easy to use working methods and tools
6. Solutions for increasing participation in working life
7. Controlling new occupational hazards, exploiting new opportunities

The leaders of Centres of Expertise are also responsible for integrating the activities towards the Strategic Goals. Within each Centre of Expertise a number of *teams* each with a more limited knowledge area are found. The teams form the organizational home base for most of the FIOH workers. Team members can be located at different locations (Regional Offices). Teams are headed by team leaders which also have an administrative leadership responsibility. The employees primarily identify with their team and the Centre of Expertise and not so much with the Strategic Goal(s) they contribute to. This may reflect the short experience they have with the new organization and may change in the future.

In addition to the teams that cover a wide range of topics, several special units with a specific role were created. The special units are of three different types: so called *Units of Excellence*; *other special R&D Units*; and *Themes or Thematic Areas*. They have the following names:

Units of Excellence:

- Unit of Excellence for Immunotoxicology
- Unit of Excellence for Psychosocial Factors

Other special R&D Units:

- The Brain and Work Research Centre
- The Musculoskeletal Centre

Themes or Thematic Areas:

- Work and Life Course: “towards a better and longer working life”
- Good indoor environment

These special units are linked to one of the six Centres of Expertise.

These special Units have different roles; the Thematic areas are supposed to focus more on co-creation and implementation of solutions with partners while the Units of Excellence operate in the scientific front line. The role of each type of these Units is described below.

5.1 Themes or thematic areas

The themes (good *indoor environment* and *work and life course*) are established in response to specific societal needs and are temporary in nature. The focus of the themes is on a coherent set of activities to actually contribute to solving a societal issue and has the character of a task force to get things done in practice in collaboration with partners. This indicates that the FIOH is sensitive for the changing needs of society and tries to formulate adequate answers. This agility to respond to urgent needs and focus on implementation is very much appreciated by the IEG. This focus, stimulated with temporary extra budget, adds to visibility and brings together all necessary disciplines to focus on the solutions for an actual problem and strengthens the implementation efforts. In order to meet the aims of the themes, it is important to set clear targets for the themes on a specified timeline and evaluate the results.

5.2 Units of Excellence and other special R&D Units

The Units of Excellence are appointed for a period of five years and engage in top-level international research in carefully focused areas with the aim to generate scientific innovations. At the same time, the Units create partnerships, channels and visions in the international scientific community to support the work of the FIOH. During the

reorganization of 2006 two Units of Excellence (Unit of Excellence for Immunotoxicology and the Unit of Excellence for Psychosocial Factors) were selected. The topics of the Units of Excellence were chosen because they were the best according to a set of criteria in a competitive procedure and they form an organizational unit. The other special R&D Centres are virtual centres, in which the work of several teams is combined. They have been formed in response to the last international evaluation that recommended that two of the main issues in working life i.e. musculoskeletal disorders and mental well-being deserved a multidisciplinary approach.

The IEG consider these Units as extremely productive and with an interesting and scientifically high profile. The IEG is impressed with the scientific output of the Units and does realize that this is because of the specific role they have been given. In that respect the Units definitely are quite a success already in the short term strategy period that has passed. The Units differ quite much to the extent to which they collaborate internally and are focussed on dissemination of their results both externally and internally. In addition, each of the Units has an overall topic area but within that topic there is quite some diversity still which may benefit in the future from further focus.

The IEG supports the idea of selecting certain areas where scientific excellence is important. Of course the main issue is then, to consider why these Units are needed at the FIOH and are not the exclusive terrain of University. A number of arguments support the role of these units within the FIOH:

a) It is important to have excellent scientific knowledge on some selected work health issues, which are not easily addressed by regular Universities because they do not have the necessary multidisciplinary staff to address these issues;

b) The FIOH has good contacts with the needs of the field in order to address the right research questions that contribute in the end to societal impact and results in knowledge to the benefit of the end-user;

c) Only if you have an excellent scientific track record yourself you can optimally join and profit from the scientific community and participate in international projects and thus stay at the fore-front of research development and innovation;

d) The FIOH needs several high profile top expert – “the gurus” – who will render visibility of the FIOH as well as credibility also to other activities;

e) A high scientific profile in this field is needed to be able to attract top talent to the FIOH.

These arguments are important and the IEG therefore is of the opinion that there definitely is a role for the Units of Excellence in the FIOH.

However, the success of these Units should not turn into a pitfall in the future. The IEG supports the primary role and orientation of these Units towards scientific excellence. However, while respecting this role, it seems important to safeguard the desired effect of these Units in the future and develop a vision how they can also optimally contribute to the Strategic Goals with societal impact in the end. This may result in long-term targets of impact and a roadmap towards these targets in addition to scientific output targets. This is easily built in the already planned evaluation after their first five year period. In order to make optimal use of these Units the internal knowledge transfer deserves maximal attention and may be strengthened in the future.

In order to successfully reach its Strategic Goals, an organization as the FIOH is very much dependent on the people and their capacity, inspiration and effectiveness. In a complex matrix organization it is therefore essential that they have a good sense of direction (the Strategic Goals), good possibilities to keep up their skills and competence (the Centres of Expertise) and a comfortable and secure home base (their team or special unit). Having not only a matrix organization with teams, but on top of that several special units, with different roles, results in a quite complex organization. It is the general impression of the IEG that, in practice, this complexity is functioning rather well, although because of the recent introduction of the new organization full scale implementation is not yet reached.

5.3 Recommendations

The IEG is of the opinion that the new organization with Centres of Expertise and a simultaneous orientation towards the Strategic Goals is much better equipped to contribute to the solution of the current issues of Finnish working life than the previous mono-disciplinary departments. The IEG likes to commend the FIOH with this successful reorganization.

20) The reorganization of the FIOH still is in an early phase and further efforts towards full implementation are needed. The IEG suggests strengthening the orientation of all organizational units towards contributing to the Strategic Goals.

21) The IEG suggests that the FIOH maintains the thematic areas, because they are an effective vehicle to transfer FIOH knowledge to solutions for the actual societal problems. The IEG likes to compliment the FIOH to the efforts they have attributed to establish a partner network of all relevant stakeholders in the themes. The IEG suggests that even more effort with communication and support of advisory skills could be invested to increase impact and visibility of the themes, thus illustrating the importance of the FIOH's contribution to solving the societal problems.

22) The IEG favours the Units of Excellence. The IEG is impressed that the Units have established an internationally leading scientific position on topics of high relevance for healthy and productive working life in a fairly short period of time. The Units of Excellence deal with demand-driven research questions in a problem-oriented way, which in that sense is not what is the case in a university. In addition the Units of Excellence provide the FIOH with the possibility to keep operating at the international (scientific) podium and to attract new top talent. It is important for the FIOH to keep up this high profile to serve the credibility in society. It is also important to have a clear view on the long-term contribution of the Units of Excellence to the FIOH's Strategic Goals. With respect to their primary role in obtaining scientific excellence, this may result in formulating long-term societal impact targets and a road map towards that end goal, which can be built in the evaluation procedure of the Units. The IEG suggests that the internal transfer of knowledge of the Units of Excellence to other teams is enhanced.

6 Strategic Goals of the Finnish Institute of Occupational Health

6.1 Strategic Goal 1: The management of occupational health hazards at work as part of management practices and corporate risk management

This Strategic Goal, *The management of occupational health hazards at work as part of management practices and corporate risk management*, addresses the management of occupational hazards in workplaces, and the integration of occupational safety and health into the mainstream of corporate risk management. There are five programmes that address this goal: a) *Occupational safety and health management procedures*; b) *Accident free workplaces*; c) *Risk assessment and risk management*; d) *Promoting the efficient function of small enterprises and entrepreneurs*; and e) *Detection, control and resolving indoor environment problems*. There are 50 teams contributing a total of 69 person-years of effort to this Strategic Goal.

This goal is highly relevant to the current priorities of the Finnish government and for protection of the workforce. Maintaining the health and workability of the employed population is integral to the Finnish national effort to increase productivity. The critical actor in maintaining health and workability is the employer – as the employer controls the workplace, decides on resource allocations for controlling hazards, and plans the organization of work. Since the focus of this goal is to significantly increase the integration of occupational safety and health (OSH) into corporate management, the strategy is focused on the most appropriate actor, the employer, and the employer's actions affecting worker health and workability. The FIOH's organizational efforts to address the goal are highly relevant because they are designed to influence employers to establish or maintain occupational health and safety programmes as part of management of an enterprise. The programmatic elements of the Strategic Goals appropriately focus on the major contributors to morbidity, injury, and death. These include accidents and indoor air hazards, the workplaces in most small enterprises, and the processes the employer is responsible for (risk assessment and risk management).

This FIOH goal is relevant to the policies of the Finnish government because of its link to increasing productivity and lengthening working lifetimes. No other Finnish public or private effort is more germane to influencing the way employers manage the health and safety risks within their workplaces and to enable and equip employers to know what management decisions will alter worker health and workability. Beyond the fact that this goal addresses the employer's decision-making and management efforts, which are the chief contributing factors to good occupational safety and health and workability, the demand can be assessed by requests and comments of clients and stakeholders. In the "client demand" survey (2007-2008), which included a target of 400 representatives of different industries, 72% indicated that improvement of management practices was expected to be an area of investment in future years. Additionally, 64% indicated that improvement of working conditions, including indoor air measurements, would be a focus of future investment.

Is the FIOH efficient in addressing this Strategic Goal? Since the goal pertains to the major way worker health and workability is maintained in the workplace, it is appropriate that the FIOH dedicates the most staff resources to this goal. The FIOH has more teams and person-years participating in addressing this goal than any of the other goals. This resource

commitment is appropriate because of the range of efforts required to influence and equip employers, particularly those who are in small enterprises or self employed, is large. Since the majority of the Finnish workforce is employed in enterprises with less than 250 employees, and since small enterprises often have limited resources for occupational health and safety, multifaceted approaches are needed to make an impact. The FIOH clearly understands this and is dedicating appropriate resources to the effort. How efficient the deployment of these resources is can be considered by evaluating the allocation of resources to the modes of operating. As a prerequisite to that exercise, it is necessary to determine whether the FIOH has a comprehensive idea of the various modes of operation and if they are part of a systematic and comprehensive process rather than separate efforts. Figure 1.1 of the Base Report for all goals, including this one, indicates that a systematic process is envisioned and utilized, and it identifies and links all the significant modes of operation to address each goal. A chain of innovations leading to impact is identified for the goal. The modes of operation are identified with outputs and outcomes (impact). The actual allocation of resources within Goal 3.1 are shown in Figures 3.1.1-3.1.6 which demonstrates that the majority of resources are in the transfer, dissemination, partnerships, and other efforts that can move employers to action. This is highly appropriate because generally the main need in addressing this goal is for activities that raise awareness and provide known and accepted tools and methods for employers rather than just to generate new knowledge about hazards, risk, and controls. Where additional research is needed is in the area of how employers obtain and use occupational health and safety information and how they may be motivated to put it into practice. It would be useful to see more research in this regard.

The efficiency and quality of the goal-related activities can also be assessed by determining the extent to which the outputs of the programmes align with the aimed impacts and involve the appropriate partners. The IEG found that the outputs have generally been found to be effectively aligned to aimed impacts. Quality may also be assessed by the extent to which each project has adhered to internal quality control/peer review processes. All projects have adhered to these guidelines. Clearly, projects with good quality can at times not have the impacts anticipated due to extenuating circumstances and external factors. The projects related to this goal also can be assessed for quality to the extent to which they result in papers and products that are peer reviewed, published, or otherwise used or lauded by clients and customers.

Impact can be assessed in terms of intermediate and ultimate outcomes. The ultimate outcomes for this goal include reduction of the morbidity, mortality, and injury rates in Finnish workplaces and the increase in the length of well-functioning worker life. Currently, these impacts cannot be assessed since the time since the formation of the goal and the initiation of the goal activities is short. However, even in the short time perspective, some intermediate outcomes can be identified and assessed. These are prerequisites for the ultimate outcome and generally indicate the extent to which the information, knowledge, and products of the FIOH from the projects directed at this goal move others in society to action. These others can include employers or worker groups, government agencies, mediators, and intermediate partners. Although the time frame for this criterion to be meaningful is also too short, there are some intermediate actions (outputs) that can be considered. These include, the development of partnerships, the production of needed informational and communication materials or the establishment of precursor conditions that will eventually be likely to lead to impactful intermediate and ultimate outcomes. Each of the component elements of this goal have resulted in products or enabling precursor conditions. Notable is the development of a hierarchical strategy and tool kit for small businesses. However, at this time there are little

data on the use of these approaches by small businesses. Moreover, it is not clear to what extent the programmes supporting this goal involve research on the organizational dynamics and decision-making of small businesses and the most effective ways to reach them.

In summary, this goal is highly relevant to the policies of the government and the health of Finnish workers. The projects to address it are appropriate and aligned to the goal elements. They are of a high level of quality and likely to make a large impact. In the short time since the inception of the goal and its component projects, there have been useful outputs and appropriate intermediate outcomes.

6.1.1 Recommendations

The establishment of the Strategic Goal, *The management of occupational health hazards at work as part of management practices and corporate risk management*, and the progress made by the FIOH represent a major means to address Finnish national policies for a healthy, productive workforce. This is critically an important goal because it focuses on integrating occupational safety and health into business management processes. The FIOH has made significant progress toward this goal through the component programmes. To continue this progress it is recommended that:

23) The FIOH should conduct additional research on how employers get and use occupational safety and health information. This should include research on organization dynamics and decision-making.

24) The FIOH should expand its research efforts to identify and develop innovative ways to reach and motivate small business decision-makers.

6.2 Strategic Goal 2: Innovative, regenerative and healthy work communities

This Strategic Goal, *Innovative, regenerative and healthy work communities*, places emphasis on well-organized work, well-functioning work communities, and the development of occupational skills as the foundation of regenerative, cooperative and innovative personnel. Under this general aim there are three major programmes on: a) *Mastering changes and flexibility at work*; b) *Innovative and healthy organizations and work communities*; and c) *Promoting gender equality and diversity at work*. Special focus is placed on the psychosocial work environment at Finnish workplaces and methods to improve work organizations and mastery of change processes.

Based on its own research, the FIOH develops tools for change management and work organization models that promote well-being, lifelong learning and the efficiency of operations to be used at workplaces, in occupational health services and other organizations developing working life. The FIOH develops methods for fostering a workplace culture that converts the diversity of people into a resource, regardless of differences arising from age, gender, occupation, cultural background or personality. The FIOH provides information about the effects that new organizational structures and information and communication technology (ICT) systems have on the work community and efficiency of its operations. The FIOH also

assesses the effects of various management systems on the well-being of personnel and productivity. Together with social partners, The FIOH carries out organizational change management interventions. The FIOH offers organizational development and recruitments services to Finnish workplaces. The FIOH's main effort is to develop and introduce valid methods based on its own research findings for occupational health and safety (OHS) and organizational development (OD) personnel as well as to workplaces to improve work organizations. Indicators of well-being and improvement at work are available from the results of periodic Work and Health surveys carried out every fourth year by the FIOH. The main indicators for this strategic area are measures of quality of working life and the well-being of employees:

- opportunities for developing one's own professional skills at work
- fair treatment of employees
- work climate encourageing and supporting new ideas
- equal treatment of women and men
- work/life balance
- equal treatment of immigrant workers
- carrying out work climate surveys and organizational development projects at the workplace level.

This Strategic Goal is highly relevant and directly linked to the FIOH's mission and results and contributes to addressing key priorities in Finnish working life. Although there has been a relatively short period since the 2006 reorganization, the FIOH has made excellent and commendable progress in addressing several key areas. These include change management in the municipal sector (and in general), supporting the national KASTE programme ("National Development Plan for Social and Health Care Services, KASTE 2008-2011") by participating in work groups of the Ministry of Social Affairs and Health, developing innovations in production and services, promoting well-being at work through interventions, promoting gender equality in working life, gender mainstreaming and working life balance and addressing diversity at work (including disability and immigration). The system effects of the FIOH's actions within this Strategic Goal are realized mainly via intermediating actors like OHS and human resources (HR) professionals. System effects are also possible via contributing to the national PARAS (National project to restructure municipalities and services) programme and the KASTE programme by the Ministry of Social Affairs and Health as well as the Ministry of Employment and the Economy. Stakeholders have clearly identified the importance and relevance of this Strategic Goal. However, some client organizations reported a lack of awareness of FIOH services in the area of well-being development and in particular in relation to the management of work-related stress. It is recommended that the FIOH further disseminates its services, methods and products to stakeholders and client organizations in a more proactive, businesslike manner.

Seventy-five percent of resources for this Strategic Goal are allocated to research and development, 10% to training, 10% to information and communication and 5% to advisory services. This distribution of resources is appropriate given the targets of the goal. However, more resources might have been allocated to training and advisory services to ensure better transfer of knowledge to clients and occupational health services.

The impact of this Strategic Goal is evident not only in research results but also in the development of new methods, tools and guidelines, the implementation of interventions and their evaluation and the provision of training. Research produced through the Unit of Excellence for Psychosocial Factors underpins the work conducted in this strategic area.

A study focusing on the management of change and the role of supervisors in change is going on in five municipalities throughout the. Data is collected by interviews, documents, and surveys based on FIOH's Kunta 10 study (a study in which the impact of changes in the psychosocial work environment was investigated on the health of municipal employees). A large network of research institutions, municipal organizations and stakeholders has been formed to provide expert support in the collection of data, evaluation of the study findings, and for disseminating good practices in change management.

The *Change Workshop Method* has been developed and used in 2007-2008 with several client organizations and a report was drawn up for the organizations involved. Individual components of the workshop methodology have been developed as methods of their own to give a better understanding of the concept changes.

Innovations in production and services have been regarded as a prerequisite of a successful future for the Finnish society. Four comprehensive reviews on the topic were conducted, and the mechanisms that support the emergence of innovative practises were studied in eight organizations in the health care sector.

The FIOH participated in the validation of the Utrecht Work Engagement Scale and constructed methods to study good practices in supporting job knowledge, work and well-being in different professions. The FIOH also conducted intervention studies on the impact of participative approaches on work, psychosocial work factors, job knowledge, and worker well-being. During 2009-2010, the results of these studies will be utilized in recommendations and in a handbook about manageing the well-being of work, which will be written by FIOH experts. Inappropriate behaviour and bullying were also addressed in an intervention conducted among the personnel of eight primary schools. A new booklet on the topic was published in 2008. The FIOH also contributed in the construction of a guidance sheet on the best practice in workplace violence and bullying interventions and a guide on the topic by the WHO. Several means of information transmission are used to distribute the information of and the methods created in the studies into organizations, their personnel and other interest groups. Training, consultations, and interventions on the topics studied are also required frequently. The FIOH organizes international courses on these topics and writes popular booklets and articles to help internal actors at the workplaces to deal with these issues.

The Finnish government issued an action plan for gender equality in 2004-2007. The FIOH launched the "Work/life balance" research and development programme (2005-2009) to support the balance between work, family, and other spheres of life. The programme initiated several research and development projects during 2006-2008. The MONIKKO project (a research- and development project on workplace equality and diversity) emphasized the importance of equality from a wider perspective taking into account age, ethnicity, and family situation. The project yielded new data and new practices, e.g., a model Equality plan, a guidebook, and a fact sheet on the Age-friendly workplace. A Diversity Barometer was carried out in order to explore Finnish HR managers' attitudes to workplace diversity. All these actions have been carried out in close cooperation with a wide-ranging network of relevant partners, both national and transnational. The resulting recommendations have benefited governmental action plans for equality, and the results have been widely disseminated to workplaces. One element of the diversity concept is the integration and reintegration of disabled people into ordinary employment. An Accessible Workplace Method (AWM) and an electronic databank on good practices of accessibility have been developed by the FIOH in partnership with all relevant actors in Finland.

Diversity and multiculturalism in Finnish working life will grow as the number of people with immigrant origins increase. The Finnish immigration policy actively promotes work-related immigration; therefore, new studies have been initiated on good workplace integration practices in cooperation with health and safety professionals and HR managers. A questionnaire study was carried out in 17 public and private sector workplaces, with 208 immigrant and 600 Finnish workers. The aim was to gain new information regarding multicultural work organizations, to increase knowledge of the psychosocial work conditions among immigrants, and to produce information on the promoting factors of well-being among immigrant workers. A further aim was to disseminate new knowledge to relevant target groups and policy-makers. The project received much public interest while numerous interviews were given; feedback seminars were also held in the participant workplaces.

In addition, researchers at the FIOH have been coordinating and leading partnership with the National Institute for Health and Welfare and Finnish Rehabilitation Foundation, in a research consortium funded by the Consultative Committee of Ministries. The objective is to update existing information and direct future research on integration policies and practices in Finland. This information is very necessary, as the Finnish immigration policy faces new challenges due to the rapidly increasing number of immigrants.

Overall, the impact and societal usefulness of the work conducted through this Strategic Goal are important and wide. The FIOH is to be commended for progress made.

6.2.1 Recommendations

The IEG commends the FIOH for its work in relation to this Strategic Goal, *Innovative, regenerative and healthy work communities*, which is clearly in line with the needs of the Ministry of Social Affairs and Health and other Finnish authorities. Although there has been a relatively short period since the 2006 reorganization, the FIOH has made excellent and commendable progress in addressing several key areas. These include change management in the municipal sector (and in general), supporting the national KASTE programme by participating in work groups of the Ministry, developing innovations in production and services, promoting well-being at work through interventions, promoting gender equality in working life, gender mainstreaming and work life balance and addressing diversity at work (including disability and immigration). Some recommendations for further improvement are the following:

25) The FIOH is to be commended on the diversity and quality of its research programmes in relation to work organization and well-being. The IEG recommends that the FIOH educates occupational health services on results, methods and tools regarding this topic in the Occupational Health Services training courses.

26) The FIOH has impressive expertise, research and methods in the area of intervention studies to promote well-being at work. The IEG encourages the FIOH to continue in this area conducting more intervention and evaluation research and also further expanding its work on the cost-effectiveness of interventions.

27) The FIOH has also been active in research in relation to change and restructuring. The IEG recommends that the FIOH further develops its own expertise in anticipating change and meeting challenges as quickly as possible

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6.3 Strategic Goal 3: Each citizen equipped to ensure his or her occupational safety and well-being

Health and work ability of working population are debilitated by unhealthy habits, which are associated with development of lifestyle diseases and injuries that cause work disability. This Strategic Goal, *Each citizen equipped to ensure his or her occupational safety and well-being*, is based on the idea that every citizen may influence his or her own choices as well as the well-being of fellow workers.

The general aim of this Strategic Goal is to produce and disseminate practical and actual information for citizens on relationship between working life, healthy habits and well-being and to impress and establish good practices of health and safety promotion at workplace. It involves all the experts of the FIOH and is using all the information, knowledge and skill produced in the FIOH to be disseminated to people. It is directed to the citizens' and the entire working age population's need for better information and need for the tools to be used at workplaces

The aimed impact is twofold: to disseminate information via websites, publications, articles, media etc. and to directly influence the behaviour and actions at workplaces.

There are two main programmes under this Strategic Goal: a) *Citizen's awareness of their occupational health*. This programme focuses on dissemination of information produced by other programmes and the FIOH's experts. It is concentrating on websites, publications, interviews, radio and TV programmes. The second programme, b) *Making the workplace as an arena for health promotion.* This programme is aimed at creating opportunities for good healthy behaviour and at healthy and safe life choices at workplaces.

To accomplish the aims of this Strategic Goal, the FIOH is widely collaborating with important actors in the field, e.g. with the MSAH and other decision-makers, employers, employees, occupational health services, Duodecim Medical Publications Ltd, media (TV, radio, periodicals etc). The FIOH is internally also in process of developing its own publications, periodicals, and websites in the area.

This Strategic Goal is a very ambitious one trying to reach all citizens. It is relevant, important and much needed in Finland. The programmes provide a good start, but need broadening to achieve broad impact. At the same time the real impact of the activities is difficult to monitor if the population/citizen level is really the target**.**

As to the MSAH's Performance Agreement for 2008-2011 and performance targets for 2008 (in English) and 2009-2011 (in Finnish only) there are very few items mentioned in the critical success factors and strategic goals which could be interpreted as referring to this Strategic Goal.

- more chances to have a say at work (improvement %)
- greater flexibility at work e.g. telework (%)
- number of general interest publications (400)
- number of visitors at websites 2009 (110,000)

The evaluation of 2004 made several recommendations towards better information dissemination and about the contents of the information stressing the phenomena of changing Finnish working life (mental health issues, ageing, stress, well-being at work etc).The

progress has been remarkable. The evaluation of 2004 recommended also some e-learning opportunities to be built up, but there the progress has been limited.

The content of the FIOH's e-service has made a "great leap"; now it is directed towards the solutions of the problems of modern Finnish working life, as the evaluation 2004 recommended.

The web service of the FIOH (in Finnish) in relation to this Strategic Goal is good – compared to other Finnish alternatives and competitors in Finnish. It is highly policy relevant. The website www.ttl.fi is easily accessible and easy to use. The language is good and understandable for everyday Finnish laymen and -women. It serves its users well, and provides no cul-de-sacs. The content is informative and interesting. The highlights are freshly written and not too intrusive in design.

As to the resources, in the FIOH's new organization 12 person-years (4+8) working in 6+13 teams has been assigned to this Strategic Goal. This is by far the smallest allocation for the Strategic Goals. The summary allocation of resources according to mode of operation shows 60 % to information and communication, 30 % to research and development and 5 % to training.

The aimed impact of this Strategic Goal is to produce and disseminate information. It is stressing the individual person's unhealthy habits. The safety issue is vaguely presented. No indicators or outcome measures are used to measure the aimed impact.

Programme a) *Citizen's awareness of their occupational health* is concentrating in websites, publications, interviews, radio and TV, etc. It is societally very much in need, due to the huge number of small enterprises mostly without proper occupational health services and without information how to act to achieve health and safety at work as well as optimal health and safety in general living.

Programme b) *Making the workplace as an arena for health promotion* lists as the main target groups different actors (employers, employees, occupational health services). Its focus so far is on alcohol consumption. Alcohol is a major Finnish problem both at work and at home. Thus, this aspect of the Strategic Goal is highly policy relevant and has high societal usefulness. The results of the intervention study are encouragingly good. Here the numerical objectives are set to the use of A-Step Tool, which should be used by 2012 in 75 % of the OHS.

The concept of Health Promotion is here reduced to alcohol policy and to a specific tool. It is understandable as a start of the use of this kind of methods which need strict scientific evidence and at the same time easy usability. In the future health promotion should be expanded into many other fields of life, perhaps including Health and Safety Promotion would provide opportunities to educate on mental health issues, ergonomics, driving safely, falls, noise, violence, stress, etc.

6.3.1 Recommendations

The IEG has the following recommendations for the Strategic Goal *Each citizen equipped to ensure his or her occupational safety and well-being*:

28) The new strategy has brought "the citizen" more to daylight as a client/group of clients. The activities up to now have shown good level of achievement, although the conceptual range of the Strategic Goal 3 can be broadened. The IEG encourages the FIOH to consider the benefit to small businesses that can be reached through this Strategic Goal and to incorporate all relevant health and safety topics.

29) In order to fully develop and evaluate the impact of this Strategic Goal, the anticipated results should be better defined and performance measures should be developed and used to measure impact.

30) The good progress in website development should be continued, and a strategy should be developed to increase and evaluate its use and usefulness to the users. The short-term value might be assessed by user panels and long-term impact on health and safety of individuals would be a worthy research topic in international implementation research.

6.4 Strategic Goal 4: Providing authorities with information for promoting occupational safety and health

The general aim of this Strategic Goal, *Providing authorities with information for promoting occupational safety and health,* is to provide the authorities and other decision-makers like members of parliament and social partners with brief and understandable information of occupational health and safety research results. Under this general aim there are three major programmes on: a) *Providing authorities with up to date information on occupational health and safety research;* b) *Providing authorities with information on trends in occupational safety and health*; and c) *Improvement of effectiveness in occupational health services (OHS).*

Information to the authorities and other decision-makers is delivered through expert opinions or pronouncements for ministries and authorities, participation in working groups and task forces of the ministries and other authorities and social partners. Regular surveys on occupational safety and health are carried out tri-annually (such as Work and Health surveys, Work Ability Barometer and Survey on OHS). Some industry-based surveys are also done based on current needs. The results of these surveys are published and relevant results, including the recommendations of actions needed, will be given directly to the decision-makers, e.g. in tri-partial meetings in the Ministry of Social Affairs and Health. These results are also published in the specific internet/extranet information system, which is constructed particularly for the OSH authorities and OHS providers. The FIOH provides data for the information steering of OHS, consultation, training and education, not only of the OSH professionals but also employers and employees. The target population for the FIOH's developmental projects is not only the working population but also persons in working life marginal.

This Strategic Goal is directly linked to the FIOH's policy relevance and results and to addressing key priorities in Finnish working life. Although there has been a relatively short period since the 2006 reorganization, the FIOH has met the first two targets of this Strategic Goal successfully in a number of ways. In addition, good work has been undertaken in relation to improving effectiveness in occupational health services. These are discussed in more detail below.

The planned resources in 2006–2008 for this Strategic Goal have been around 35–40 person-years. Forty percent of resources are allocated to information and communication, 30 % to R&D, 2 % in training and 5 % to advisory services. This distribution of resources is reasonably appropriate given the targets of the goal. However, more resources could have been allocated to training and advisory services to ensure better transfer of knowledge to authorities and services.

The 2004 evaluation of the FIOH suggested that the use of FIOH websites should be increased and electronic publishing should be further developed. The FIOH now publishes an electronic newsletter which is delivered by e-mail to 3,500 decision-makers and clients. It is distributed six times annually and provides information on both Finnish and international research results as well as information on services, products, training of the FIOH and events provided and organized by the FIOH. This initiative is in the right direction and has been well-received by clients. However, to achieve greater impact it is important to combine this type of information dissemination with more directed approaches in a proactive manner.

Another important FIOH initiative is the organization of the Horizon seminars that bring different stakeholders together since last year and allow them to debate key issues. This type of initiative can also further strengthen networking and should be promoted.

FIOH produces, collects, analyses, interprets and disseminates surveillance information to support authorities, particularly the Labour Safety Unit of the Ministry of Social Affairs and Health, and the regional Labour Safety Inspectorates. The authorities can use information in the planning and focusing of their activities and in the follow-up of the effectiveness of their intervention activities. Many OHS surveys have been carried out and registers are kept. Data are analysed and interpreted by FIOH experts regularly. FIOH surveys and registers are the basis for reports which are distributed in print and freely through the Internet. A specific Internet/Extranet information system has been constructed particularly for the OHS authorities. The Working Conditions and Health Information System in Finland is an important initiative that includes key data on working conditions and health in Finland and its 20 provinces. The expansion of the system to construct regional and industry-specific profiles, to include new risks, health inequalities and costs of health hazards is highly encouraged.

As concerns the third target of this Strategic Goal, *the improvement of the effectiveness in occupational health services*, the FIOH has worked to improve the data collecting system on OHS and has produced guidelines of good occupational health service practices. Two large research projects have focussed on OHS processes and practice. A number of Cochrane reviews have been produced. The FIOH arranges qualification and supplemental education to OHS professionals and experts. FIOH activities are in the right direction. However, there are regional variations in OHS provision. In certain regions there is shortage of occupational health care staff (occupational health physicians and nurses) and as such a lack of appropriate training to OHS providers. In addition, the content and focus of the training provided to OHS providers needs to be updated and be focussed towards prevention and not just rehabilitation. The FIOH can further work with OHS providers for the development of appropriate training. Such training should be multidisciplinary and address key priorities in Finnish working life, such as mental health, work ability and ageing. The FIOH should also work more closely with the associations of occupational health physicians, nurses and other occupational safety and health professionals as well as with Universities, to ensure the development of a modern training programme that is flexible to address new needs in working life.

6.4.1 Recommendations

This Strategic Goal, *Providing authorities with information for promoting occupational safety and health,* is in line with the needs of the Ministry and other Finnish authorities. The FIOH has already developed some important programmes and initiatives to achieve the key targets of the goal. The IEG commends the FIOH for providing information on research, on trends and on occupational health services to authorities in different means so as to facilitate the decision-making process. Some recommendations for improvement are offered below.

31) The IEG commends the FIOH on the development of OHS guidelines. It encourages the FIOH to continue to improve the effectiveness of OHS in collaboration with key organizations and associations of relevance to this area. Due to great demand, regional differences and availability of expertise should be considered in this context. Training provided to OHS should be further updated to focus more on prevention and key priorities in Finnish working life (especially mental health) and to be flexible enough to also address new risks and emerging needs.

6.5 Strategic Goal 5: Smoothly flowing work processes, safe and easy to use working methods and tools

The activities in relation to this Strategic Goal, *Smoothly flowing work processes, safe and easy to use working methods and tools*, aim at establishing actual improvements in work, work processes and work methods in order to achieve permanent improvements in workers' health, safety and performance. The scope is focused on three programmes: a) *Promoting human-centred design*; b) *Human and productive working hours*; c) *Safe and healthy professional drivers.*

For the subtopic on human-centred design the focus is primarily on prevention of musculoskeletal disorders, human error and occupational accidents.

For each of the subtopics specific targets are presented: for a) *Promoting human-centred design*: Designers will start considering the human aspects of work already in the early stage of the design process; for b) *Human and productive working hours*: Ergonomic and healthy working hours in forest industry, transportation, health care, and private service are implemented; for c) *Safe and healthy professional drivers*: Working conditions and occupational health services in professional road safety improve.

In addition to the target an impact attaining process has been identified per topic. The impact attaining process for each of the sub topics is formulated as follows: 1) *Promoting human-centred design*: Improving the early design process of the working places. This is possible by including criteria of health and well-being in the design specifications and by giving designers the knowledge and access to the required data and design tools (e.g. collaborative methods); 2) *Human and productive working hours*: designing and studying new "healthy" working hour models and promoting their use by cooperation with social partners, extensive dissemination of information and ad-hoc consulting of the companies interested in changes in working hours; 3) *Safe and healthy professional drivers*: improvement of the occupational health care and working condition of the professional drivers by making pilot and intervention

studies, consultations and guidance books and booklets in cooperative networks with the social partners, trucking companies and trade unions.

Although arguments are given why these areas are chosen, this seems to be a bit of a mixed bag and some areas that may be quite relevant for Finnish society have not been included in this strategic focus. Although this may be disputed the IEG supports narrowing down the activities to specific foci. Each focus is most likely based on relevance of the problem to society and the ability and position of the FIOH to address the problem. For the chosen topics such arguments are given.

The IEG supports the relevance particularly of topic a) and b), as being generic issues with potential impact to a large group of workers and workplaces. The IEG also support topic 3 as an important area of occupational health.

The asset of topic a) is that it is the most efficient way to prevent future problems and most likely much more cost effective than trying to solve problems after the design stage. Crucial for the impact is of course the widespread acceptance of these issues among the key designers.

The relevance of topic b) may actually even increase in the future since certain working hours arrangements and schedules are major potential obstacles for keeping up work ability at older age. Effective solutions in this respect with an eye for health and sustainable work performance may therefore become a competitive advantage for companies and organizations in times of labour shortage in for instance health care.

Topic c) has relevance for the hazardous transportation sector, where most worker deaths occur. About 30% or more worker deaths occur on roads in most countries.

For the human-centred design subtopic the focus is primarily on prevention of musculoskeletal disorders, human error and occupational accidents. In order to become widely implemented it would help if the human-centred design programme is not only evaluated by its effect on these outcome variables but also by the effect on the key performance criteria of the machines/processes and the positive aspects of work such as comfort, worker satisfaction etc. In addition, evaluation on cost effectiveness of human-centred designs may be a future area of research related to this Strategic Goal. Although the listed examples of actual established impact are promising more efforts are needed for a widespread implementation. Maybe collaboration with a more technical institute would make rapid prototyping and for instance use of virtual environments more easy, which may add to future implementation. In addition, international collaboration may be enhanced to move this Strategic Goal further in the future. The examples of human-centred design seem to be quite different requiring very different expertise (sawmill machinery and splash protective clothing).

The solutions in answer to irregular working hours in the projects on healthy and productive working hours seem to have quite a good start as far as implementation is concerned. The ongoing negotiations and collaborations suggest that large implementation in for example all nurses in the health sector seems to be on its way, suggesting substantial societal impact. Because these solutions are based on an extensive scientific track record this is an inspiring example of the role the FIOH aims to play.

Interesting projects are initiated in order to increase safety, health and healthy lifestyles among professional drivers. In these projects all relevant stakeholders seem to be involved, drivers, entrepreneurs, drivers organizations, service stations, road restaurants etc. Little information is provided on the achieved effects, which may be due to the early phase of the project. However, the cost effectiveness of the project may deserve more attention.

6.5.1 Recommendations

In regards to this Strategic Goal, *Smoothly flowing work processes, safe and easy to use working methods and tools*, the IEG concludes that the research in this strategic field is an example of knowledge development in close collaboration with the end-users and other stakeholders. It thus constitutes a good example of the type of research the FIOH aims to conduct.

32) The IEG is of the opinion that future implementation of the results of the research in this Strategic Goal may benefit from more rigorous evaluation of the developed solutions and their effects both on health and performance outcomes.

33) The IEG would like to complement the FIOH with the implementation efforts so far, in particular with the innovative shift systems. The IEG would like the FIOH to continue and intensify these efforts in that and other areas and does emphasize the importance of the extensive partner network in order to establish maximal effect.

6.6 Strategic Goal 6: Solutions for increasing participation in working life

This Strategic Goal, *Solutions for increasing participation in working life*, includes two programmes, *Ensuring work career in different phases of life* and *Solutions for reduction of sick leaves and disability*. This goal took 76 person-years or 13 % of the person-years of the FIOH in 2007 and 2008. Sixty percent of the resources were used for research and development, 20 % for training, 15 % for information and communication, and 5 % for advisory services.

The programmes dedicated to this Strategic Goal have been selected by identifying the critical stages in the continuation of a person's work career, the most important of which are the transitions between work and other stages of life: from school to work, from being unemployed to working again, from sick leave back to work and from disability through rehabilitation to other work and so forth.

The programme *Ensuring work career in different phases of life* focuses on young people's integration into working life, on promoting career management, work retention and mental health, and on providing facts related to age, promoting positive age attitudes and enhancing solutions for age-related problems. The FIOH has developed methods to promote these activities. The effectiveness has been verified in randomly assigned controlled field studies.

The prototype of the *From School to Work Group Method* was developed in 1999–2000, and it has been tested in 2000–2003. The dissemination of the method has been done in collaboration with educational institutions: 214 group trainees have been trained, 7,900

workbooks of the method have been bought. The method and its verification have thus been developed before the current strategy period. During the present strategy period, the dissemination of the methods has been in the foreground. While the numbers referred above may seem impressive, they reflect only a fragment of the target groups. Because the method was developed almost ten years ago, it might also be wise to make a critical evaluation of the method and its implementation as well as to develop it further by learning from the experiences which have been obtained from its applications. One might also wonder if changed economic situation should be considered.

The prototype of *Towards the successful seniority* -project was also developed before the current strategy period, in 2003–2006, and tested in 2006–2008. The method has been published in 2008. So far, 87 trainers of the method have been certified at the FIOH. One commercial company has been certified as the distributor of the method. This is a good model for the dissemination work, and could be used in other programmes as well. The new ideas which may arise during implementation should be notified and given adequate consideration in order to update the method.

The *Age Power* training programme is based on the work ability model developed by the FIOH at the beginning of this decade. The dissemination of the training programme is taking place now through different networks, for instance by various management and leadership development institutions. This has become perhaps one of the most well-known programmes in Finland.

The programme *Ensuring work career in different phases of life* is a good example of the FIOH's mode of operation. The projects are based on sound research, the results of which are then turned into toolkits for trainers and other users. It also exemplifies the enduring character of the development of validated methods.

In the programme *Solutions for reduction of sick leaves and disability* the main goal is to develop research-based products which enhance participation in working life during the periods of ill health. Part-time sick leave was introduced in Finland recently, and currently it is under reform so that it can be used sooner after the beginning of sick leave. Here, the FIOH has supported the reform by studying the feasibility of an earlier possibility of part time sick leave. This research had immediate nationwide impact because of its support to the new legislation.

Another focus has been the prevention of upper extremity disorders in occupational health. The FIOH has also trained occupational health services and psychiatric clinics in the diagnostics and the treatment of depression, which has become a very important cause of disability pensions. One further focus has been in reducing the effects of occupational allergies.

Due to the exceptionally large baby boom generations after World War II, the population of Finland is ageing more rapidly than the populations of other EU countries. Thus, these programmes are highly relevant. During the next decade, the situation in Finland is permanently changed so that the generations entering the labour force are smaller than the retiring generations. Mainly because of this perspective, the recent Finnish governments of varying political coalitions have systematically emphasized the need to prolonged work careers.

The Strategic Goal of the FIOH *Solutions for increasing participation in working life* suits perfectly well with the long-term goals of the Finnish government. It also fits well with the strategic goal of the Ministry of Social Affairs and Health (MSAH) *Increasing the attraction of working life*. Similarly, this Strategic Goal also fits well with the FIOH's mission, part of which is to encourage participation in working life.

We conclude that this Strategic Goal is well integrated into governmental goals, and the IEG regards it as very relevant. Also its two programmes, *Ensuring work career in different phases of life* and *Solutions for reduction of sick leaves and disability* are well chosen to support the achievement of the Strategic Goal.

It is impressive to observe that the effectiveness of methods used in the first programme have been carefully developed and tested before they were implemented. It is very important to observe that this has taken some time. In both cases, we talk about 6-10 years, before the product is in the market.

The time is not ripe to draw conclusions about the outcomes and the impacts of the programmes supporting the Strategic Goal. The programme *Solutions for increasing participation in working life* is important and can be regarded as a success. The final results are not yet totally clear, and only a fraction of the potential users of these products have become aware of them and of those only a small portion had taken the advantage to put them into practise.

The second programme, *Solutions for reduction of sick leaves and disability*, has already had a partial societal impact. The FIOH has supported the part-time sick leave legislation with research focusing on the feasibility of the reform. However, solutions to reduce disability require still much work from the FIOH as well as from other agencies working in this area.

Taken together, the programmes related to this Strategic Goal have already lead to desirable social impacts. However, the dissemination processes are still on their way, and it seems that they have a fair chance to become significant at the societal level.

6.6.1 Recommendations

The achievements of the FIOH in relation to this Strategic Goal, *Solutions for increasing participation in working life*, are excellent. They demonstrate, however, the long period from initiation of a programme to practical implementation.

34) The IEG recommends that now it is time to intensify the efforts to disseminate the methods and tools developed. This means that resources should be more focused on dissemination and implementation. However, this should not be done at the cost of research and development: the methods need to be continuously developed. This could be done in the mutual exchange of ideas between R&D and dissemination and implementation. In spite of that, the non-R&D share of the resources could be increased.

6.7 Strategic Goal 7: Controlling new occupational hazards, exploiting new opportunities

This Strategic Goal, *Controlling new occupational hazards, exploiting new opportunities*, involves identifying and understanding the ways that technical, economic, and social developments influence the nature and content of work. It supports predicting the direction of working life and the new hazards that might occur in the future. In addition to identifying new hazards and conditions, this goal supports identifying new innovations, solutions, advice and information to promote worker well being.

The workplace is continually changing and new hazards are always emerging. This is the result of new products, techniques, and changes in the way work is organized. In order to ensure the working life and productivity of the nation, it is necessary to have an up-to-date, forward-looking capability. The staff involved in this Strategic Goal provides such capability and focuses on current and future hazards and new approaches to control them. A society that is not looking forward is not likely to anticipate problems and allocate resources in a timely fashion. This is particularly important because the working life of the population is inextricably bound up with the national productivity and global economic processes. In addition to the general sensing of new hazards, there is need for focusing on specific issues such as nanotechnology, hypersensitivity and musculoskeletal disorders, information work, and brain health that have the potential to, or are, manifest in the current Finnish economy and working life.

One emerging technology that is likely to have an impact on Finnish as well as international productivity is understanding phenomena at the nanoscale and harnessing that understanding in practically all sectors of society. This is the promise of nanotechnology. Such a large promise is accompanied by large expectations and large concerns. Clearly, given the current uncertainties and toxic potential, workers and the public have concerns about the hazards of nanotechnology. Moreover, employers, investors, and entrepreneurs have these concerns. Nanotechnology has tremendous potential for societal benefit but investment in this emerging technology may be stalled by uncertainties about the human health effects. Adequate investment in nanotechnology is likely to yield major advances in all economic sectors, particularly energy, transportation, construction, food production, information and communications, and medicine. Rapid advances have already been made in therapeutics and diagnostics involving nanomaterials and more effective and efficient medical care may result from additional applications. However, engineered nanoparticles, because of their size and surface area, have the potential to be more toxic than larger particles of the same composition leading to respiratory and cardiovascular disease as well as impacting the brain and other organs. Adverse health effects from some engineered nanomaterials have occurred in test animals. It has also been shown that humans exposed to incidental nanoparticles (e.g. products of combustion) have increased cardiovascular and respiratory effects raising the specter of public resistance to development of nanotechnology. Currently, there are more than 800 nanomaterial containing products in commerce. It is estimated that by 2015 there will be 2 million workers globally needed in nanotechnology.

Failure to identify and manage the risks to workers and the general population could cause a significant health and economic burden, and result in stifling this promising technology.

Uncertainties about health and safety effects are a key concern of investors and businesses, and could likely cause society to fear, and possibly reject, nanotechnological advances. This

major barrier can be removed or reduced by a dedicated research programme on the health effects and exposure controls for the nanomaterials. The people most exposed to nanomaterials are the workers involved in research, manufacture, production, disposal, and recycling of nanomaterials. These people could be at increased risk of respiratory, cardiovascular and other diseases and could foreshadow risks that others in the general population may experience. There is also concern that nanoparticles may be explosive, flammable, or stimulate uncontrolled catalytic chemical reactions. A highly focused effort to study the safety and health effects of nanomaterials, identify exposures and controls, and develop guidance for employers, workers, and government agencies is needed and will provide investors and business leaders the information needed for making economic decisions about investment in this technology. The efforts of the FIOH in this regard are quite relevant.

The incidence of allergic disease has increased over the last few decades in developed countries such as Finland. In addition to industrial chemicals, workers may also be exposed to mold in damp buildings. The amount of surface and structural dampness in Finnish buildings has grown to a significant extent and the possibility of mold exposure for indoor workers has increased. This can lead to increased worker health problems and decreased productivity. There is an urgent need for further information about the pathogenic mechanisms of damp building mold disease. New molecular and genetic tools and evidence are available to use in the identification of these mechanisms. There is need for and value in a focused research programme aimed at addressing hypersensitivity disorders. There is also need for exposure assessment and control technology research and guidance.

Musculoskeletal disorders also appear to be increasing in prevalence and are responsible for extensive lost work time. Moreover, they are health problems that can reduce workability and productivity. There is a major need to clarify the cause of musculoskeletal disorders and to identify ways to prevent them. The growing body of evidence about the multifactorial causes of musculoskeletal disorders requires innovative research to be conducted.

The widespread and increasing characterization of much of work as “knowledge work” points to the need for understanding those factors that lead to successful conduct of the work or problems arising from it. In this new environment, worker productivity and health are linked to physiologic responses to information technology. Maintaining cognitive fitness in knowledge work environments is a critical area for study. The multi-tasking demands of modern work may present significant strain on the brain, on cognitive functioning, and productivity. This is a relevant area for focused research because of the large number of workers in such circumstances, and the need for the development of guidance on how to control physiological and mental overload and fatigue and fatigue research.

The allocation of resources for the Strategic Goal *Controlling new occupational hazards, exploiting new opportunities* appears to be appropriately apportioned. The largest portion of the resources are where they should be expected to be in the mode of operation involving better scientific understanding of the phenomena and development of peer reviewed science publications. A critical feature that could be better envisioned and implemented is the effort to assure that the findings are disseminated to other parts of the FIOH to use in building on the information. This Strategic Goal is essentially aimed at sensing and exploring new hazards and also controlling them. Both of the objectives seem under-supported and should receive more focus. The development of risk control and health promotion practices seem to have too few resources allocated to it.

The quality of the work conducted to address the goal is high and represents strong areas of science particularly in the area of hypersensitivity, musculoskeletal disorders, brain impact, and increasingly in the area of nanotechnology.

The impact of the Strategic Goal *Controlling new occupational hazards, exploiting new opportunities* is potentially quite large. An identification of new hazards early can result in implementation of controls in a more timely and cost effective way. Already as a result of some of the projects that focus on this goal, guidance has been developed to prevent worker exposure to various nanomaterials. Other efforts have led to conclusions about age and cognitive function in air traffic controllers. For the most part, the elements of the goal pertain to hazard areas of significant concern (e.g. nanotechnology, brain disorders, allergens and musculoskeletal stressors). There is also critical need for the goal to focus on keeping track of rapidly changing working life and the emergence of new risks. There should be specific projects to address identifying new trends and problems not currently known.

6.7.1 Recommendations

The FIOH continues to be an effective and farsighted sentinel for Finland in identifying and controlling new hazards. The efforts to address the Strategic Goal *Controlling new occupational hazards, exploiting new opportunities* are highly productive and effective.

35) To continue its successful efforts in reaching this Strategic Goal, the IEG recommends that the FIOH develops a formalized activity, like an observatory function, for anticipating occupational hazards that are not yet known (for example, from climate change).

36) The IEG recommends that the FIOH continues to assure that the findings of programmes in the Strategic Goal *Controlling new occupational hazards, exploiting new opportunities* are integrated with other Strategic Goals.

7. European and international activities of the Finnish Institute of Occupational Health 2006–2008

The FIOH is a major contributor to EU research projects, and it is participating in EU working groups to write guidelines, revise directives and develop correct implementation of the directives. The European Commission frequently asks the opinion of the FIOH's experts. The FIOH has also an important impact on technical standards and EN/CENELEC/ISO/IEC standardisation. The experts of the FIOH in the field of protection and product safety have direct contacts with European Commission, enterprises, labour and industry.

An example of the activities of the FIOH is the planning and establishment of the European Occupational Safety and Health Network's (EUROSHNET) EU Office (www.euroshnet.org). The aim of this network for occupational safety and health experts involved in standardization, testing/certification and/or related research is to improve the transfer of research results to European standards and safety assessment of the products.

The high quality of FIOH research and science is seen in successful EU Framework and other bidding successes and in the request of the Bilbao Agency that the FIOH coordinate the large "Topic Centre Occupational Safety and Health", as well as in continuing leadership by the FIOH in cutting-edge collaborative topics of nanotechnology and psychosocial factors at work. FIOH Centres of Expertise are conducting many scientific projects with partners from other countries, particularly from Europe. Outputs are many and impressive from the work of the FIOH and partners.

The FIOH is greatly valued by the WHO and the ILO. The FIOH has been an active Collaborating Centre for each since the 1970's and contributes to the well-being of workers worldwide through its contributions to the international organizations. The FIOH Director is a member of the Advisory Board of the WHO Network of Collaborating Centres in Occupational Health and a FIOH staff member leads global activities under WHO Global Plan of Action Objective 3: Development of Occupational Health Services. FIOH efforts with the WHO European Regional Office (EURO) include contributions to the Baltic and Northern Dimension Networks. These are valued by the WHO as potential models for other parts of the globe. The FIOH contributions to the ILO are numerous, but work on Occupational Safety and Health country profiles has been of particular value for the ILO and countries. Current efforts by the FIOH include assisting developing nations in the East African Regional Programme to prepare sectoral profiles. The Newsletters published by the FIOH together with the ILO and the WHO constitute major communication vehicles for developing nations.

The FIOH carries out its European and international collaborations on behalf of the Finnish ministries and on behalf of Finnish, European and global workers. The knowledge of the FIOH transfers to the European harmonized standards and improves the safety of the products placed on the European market in a systematic way. FIOH experts also contribute to the European (CEN) and International (ISO) standardisation actively as chairpersons of some standardisation committees and by participating in about 25 different committees, working and project groups.

Engagement in the research, technical assistance, advice, policy development, capacity building and information dissemination in the global village also enriches the Finnish staff members while they are providing benefits for others. The globalization of societies and economies requires the involvement of highly skilled sectoral scientists to ensure advances in workplace health and safety, productive and innovative workers.

FIOH involvement in international activities is called for in its legislation and is endorsed and supported by the Ministry of Social Affairs and Health, the FIOH Executive Committee, and the Finnish Ministry for Foreign Affairs. The 2004 IEG concluded that these collaborations benefit both Finland's workers and those in other countries and strongly encouraged the FIOH to continue its global involvement with developed and developing countries, with the WHO and the ILO, the EU and Nordic countries. The FIOH has moved forward strongly, fulfilling these recommendations.

The FIOH assists in developing the quality of working life in developing nations in several parts of the globe. The East Africa Network involving five countries is advancing well with commitments from the countries and funds from the Finnish Ministry for Foreign Affairs. This work supports the long history of Finnish technical assistance to East Africa. The FIOH notes the importance of networks involving trust among network partners as a criterion for success. Steady, long-term efforts are needed as change generally requires about ten years.

The FIOH is active in the International Commission on Occupational Health (ICOH), the oldest professional association in occupational health. The new ICOH Vice President is from the FIOH, and the FIOH Director and a FIOH scientist were elected to the Board. FIOH scientists lead and are members of many ICOH Scientific Committees that provide global leadership in specialized aspects of occupational health.

7.1 Recommendations

37) The IEG commends the FIOH for the scale and scope of its European and international collaborations and strongly recommends the continuation and growth of these efforts.

38) The IEG notes with appreciation the FIOH's contributions to the health and safety of workers in developing nations through its collaborations with the WHO, the ILO and the Finnish Ministry for Foreign Affairs, and strongly recommends the continuation and growth of these efforts.

8. Client services

A key strength of the FIOH is the close connection between research and development and services provided to clients. We would argue that this connection is an advantage for the services as well as for research and development. In modern knowledge production (mode 2 knowledge production), being the format used at the FIOH (see Base Report), the interactions with society in general and users in particular constitute key components. For the FIOH these interactions are facilitated through the provision of services to clients. In the legal act for the FIOH it "may, in addition to the activities stipulated in Section 2, produce health care services exclusively for the use of another party, carry out research, personal assessment activities and other investigations and measurements relating to its sector, and with the consent of a registered person, store and use these data for research and investigation tasks in its sector". In the "Decree on the Operations and Financing of the Finnish Institute of Occupational Health 29.6.1978/50" the conditions for such services are established. In the agreement with the Ministry of Social Affairs and Health it is emphasized that the FIOH should be "ensuring that there are viable services available". In the agreement it is also stated that, apart from the budget financed by the state "the Institute can engage in activities that are financed completely with the income it earns from its work". Thus, there is a legal basis for the FIOH to provide client services and, under certain conditions to charge the clients for such services. The agreement with the Ministry actually even sets targets for profitability of such services. In the strategy document for 2006–2010 of the FIOH client services is mentioned as a core process of the Institute.

Since the previous evaluation the FIOH has reorganized its client services in relation to customer surveys. It is now organized in product lines with various products in addition to expert advice services. In 2008 an audit of client services was performed. The conclusion was that too many product families were provided and the number should be reduced to half. Another important conclusion of the audit was that FIOH employees realized the significance of client services.

Several surveys indicate that that FIOH has a very good brand name, in particular with respect to competence, integrity and reliability. The FIOH is also regarded as neutral, active and responsible. Thus, the FIOH has a very strong brand name in the area of client services. Many of the interactions with clients are described as long-standing relationships with pioneering organizations. This must be an advantage in the sense that personal contacts as well as reciprocal knowledge of the organizations would make the collaboration smoother. On the other hand, the focus on long-standing relations with organizations, presumably having high ambitions in the area of occupational health might imply that those organizations which really would be in need of strengthening the occupational health are over-looked. Therefore, it may be important to study why certain organizations and corporations do not have contact with the FIOH. They may not need the contacts, they may be unaware of the benefits that are provided by the FIOH, or they may have low ambitions in the area of occupational health.

In interviews with some clients of the FIOH, problems of finding the relevant competence in the FIOH have been mentioned. The personal knowledge of responsible persons among the clients has been described as the key factor to locate relevant individuals at the FIOH. It is true that the FIOH website has a system to find persons with knowledge in particular areas, but the system was described by a couple of interviewees as cumbersome to use. The IEG expects the new website to be more user-friendly also in this respect. In addition, the FIOH presently is not very active in marketing its competence.

In contacts with clients, it was suggested by a couple of the interviewees that the basis for the pricing provided by the FIOH was not very transparent. The overhead was described as enormous and the clients did not receive a satisfactory explanation to these costs. It is reasonable that a customer gets a satisfactory pricing explanation if a good relationship to clients is to be maintained. The IEG suggests that the FIOH provides a budget for services sufficiently detailed for customers to be satisfied. Likewise, some interviewees commented that the FIOH would benefit from improvements in client orientation and presentation skills.

The Base Report describes the key clients of the FIOH as large towns and government, but not private enterprises even though they apparently constitute a majority of the workplaces in Finland and also are the largest group of the clients as suggested by figure 4.2 of the Base Report. The text is also in contrast with descriptions elsewhere in the Base Report where large companies like Nokia and Stora Enso are mentioned, as well as smaller and medium-sized companies like many of those in the transport area. It should be noted that the vast majority of personnel in enterprises work in small and medium-sized companies. It might be worthwhile to consider if the strategy for services in relation to private enterprise needs to be revised as well as the internal perception of the role of the FIOH in that regard. The FIOH might also consider if service companies, as an increasing proportion of the private enterprise in Finland, should be considered separately.

With regard to services, it is important that the FIOH is flexible and sensitive to new demands. The present financial crisis leads to new strains on the companies as well as employees. This was mentioned by a couple of the interviewees as an important new field for FIOH activities. It is commendable that the FIOH has developed a system for comprehensive client feedback, but this system obviously can be used only for existing interactions.

The service functions of the FIOH are financed through the state budget as well through client fees. Client financing could be either covering the whole costs of the services or only parts of the costs. In some cases services are provided in competition with private enterprise. In that case, it is important for the FIOH that the costs for a project are calculated correctly and

presented satisfactorily to the clients. Both the actual operational costs and the background costs for administration, development of the services and others need to be included.

As a state organization and in relation to legal obligations and other state organizations the FIOH provides some services free of charge or with only partial external financing. This is an important responsibility for a state institute. An important client for the FIOH, as well as another state authority, is the Labour Inspectorate. However, representatives for that authority were quite critical to the FIOH in regard to increasing delivery times and insufficient support. In view of the important role of labour inspectors for the work safety and health, the basis for this critique needs to be resolved.

The client demand survey indicates that that a number of the knowledge areas of the FIOH should grow in significance in the future. Two thirds of occupational health nurses as well as company representatives stated that investments should increase in a) *Improvement of process of work*; b) *Improvement of working environment*; c) *Improvement of management practices*; and d) *Improvement of work community's functionality*. The knowledge basis provided by the FIOH could be important in all these areas, but it is necessary for the FIOH to have the manpower necessary and tools to provide for these ambitions. It should also be noted that in the areas of "Human factors at work" and "Work organizations", where the expansion areas would belong, the actual service incomes are far lower than those budgeted.

The FIOH has high ambitions in quality control of the services. This is to be commended and it is important to maintain a self-critical attitude to all services delivered. An important aspect of quality is that services are delivered in time. Improved organization of laboratories may have contributed to a decrease in the delays of laboratory analyses. On the other hand, the delays in surveys of workplaces do not seem acceptable and should be improved. The time trends for such surveys also appear unsatisfactory (figure 4.3 of the Base Report). This trend must be reversed in the near future.

In Organizational Development Services the FIOH describes two products: Aptitude assessment and a working climate survey (ParTy). When it comes to Aptitude Assessment the FIOH has a long history of high quality work. The marketing position is described as good, even if there are a number of competitors in the field. Obviously, the R&D in the area, as provided by the FIOH, is important. However, it may be questioned whether the FIOH should really prioritize the routine services in the area. In a situation where the expertise of the FIOH is on demand in several other areas, perhaps this might be an area where the FIOH takes a step back and concentrates on accreditation and training the staff of the consultants that presently are regarded as competitors as discussed above. The ParTy work survey is in an earlier phase of development and the direct role of the FIOH in validating and distributing this tool appears to be important.

The Work Process and Equipment Development product line is very close to the client needs but also related to the Unit of Excellence *Human Factors at Work*. It is easy to support the idea of human-centred design and providing a work life suitable for everyone regardless of gender, age, ethnic origin and functional ability. Also the focal product "The Change Workshop" is a generic tool that might be valuable both for organizations and companies. In view of other ambitions of the FIOH, like that of increasing the working life time, this may be an important area to reinforce further.

The Work Environment Development product line has clients both nationally and internationally. The REACH (Registration, Evaluation, Authorisation and Restriction of

Chemicals) regulations have increased the demands for such services and this is reflected in increased service incomes for the FIOH concerning such products. In particular the REACH training and consultancy services are examples of the desirable way of working of the FIOH as a government institute. In that regard, though, it is surprising that the FIOH states that "unprofitable analyses are reduced". This would be a reasonable statement from a private laboratory, but the basis for reduction of analysis in a government laboratory should be that the analyses are not needed.

The OSH Development and Health and Work Ability Promotion product line is focused on supporting the OSH quality enhancement activities. It is an important area as there is an ongoing restructuring of the OSH services in Finland. Many units are relatively small and would need support in this process. To some extent the activity does not seem to be very qualified as the focal product presented is a commercial product where the FIOH is the Finnish distributor. According to the Base Report the FIOH was involved in the development of the product and therefore, the IEG feels somewhat surprised that the product is now owned by a private Swedish company.

The product line for Occupational Medicine Services provides both highly qualified expert services and occupational medicine specialist training. The role of the FIOH in such training is longstanding and reflects the Finnish organization of specialist training. The advantage of the role of the FIOH in this regard is to establish and maintain a good contact between the clinical services and the research and development in the area. Another advantage is related to the possibility for the FIOH to monitor new health threats and to steer research in relation to such new threats.

The product line Training reflects a key role of the FIOH as the IEG would perceive it. Training is an effective way of introducing new knowledge and new products to many professionals in the area. Therefore, this is a very important area for the FIOH and the IEG would support even further expansion in the area. It is somewhat worrying that the actual volume of the work has decreased in 2008, but this may be temporary. The IEG concurs with the statement that effective marketing of the course activities is important.

The Information and Communication product line is important for implementation of good practices and innovations in public health. However, it is also important that information is not only provided but also read and leads to changes in working life. The perspectives in this product line do not include a clear analysis of the end-users and the impact of the information.

According to the audit of product lines from 2008 the FIOH as a whole understands the essence of service but, not surprisingly, there are differences between the different product lines. The audit recommended reducing the number of product families substantially. If that is done, it would be important both to analyze the strategic role of different product families and the perception of them among the clients. Among the challenges for the client service activities is to use the interface with the clients as a starting point in joint development of products, as well as in the research of the FIOH. This is certainly supported by the IEG. It is also important that the FIOH is not regarded as a bureaucratic and user-unfriendly organization. There the concept of a "one-stop shop" is important and should be reinforced even further. The IEG regards the services as a key interface for the FIOH with the society and supports the further improvement of this area of the FIOH. An expansion would actually be important and if the government productivity programme would hinder necessary expansion, the possibility of daughter corporations or outsourcing to perform service work

should be considered. If such a change is implemented the close connections with the FIOH must be maintained.

8.1 Recommendations

It is the impression of the IEG that client services are appreciated by the clients and are of excellent quality. The quality control programme as well as follow ups among clients will contribute to even further strengthen the services provided by the FIOH. However, in some respects the FIOH could be even stronger in the field of client services:

39) The FIOH still reaches only a limited number of the potential clients. For the planning of services in the future it might be of value to survey what potential clients are not reached at present. The IEG would suggest a survey of the organizations and corporations that are not presently reached by the FIOH.

40) Some interviewees have noted that their knowledge of competence available in the FIOH is rather haphazard and relates to personal contacts rather than active marketing. The FIOH should consider being more proactive in marketing its competence.

41) There was critique from some interviewees concerning the costs for services; the basis for the pricing was not as transparent as desired. The IEG suggests that the FIOH provides a budget for services sufficiently detailed for customers to be satisfied.

42) Much of the Finnish working population is employed in small and medium-sized companies. Furthermore, service companies increase in significance – the IEG would suggest that the FIOH expands its reports to describe the involvement of small companies and reports service companies separately. Services to these categories should be reinforced.

43) The Labour Inspectorate is an important partner for the FIOH. The IEG suggests that the FIOH contacts the Labour Inspectorate to discuss the critique from representatives for the authority, concerning delays in commissioned surveys. The IEG suggests that measures are taken to decrease these delays.

44) The FIOH should concentrate its services to areas where new services are developed and areas where the competence of the FIOH is unique. The IEG suggests that the FIOH should consider outsourcing routine services like the operation of aptitude assessment, while retaining R&D, training and quality control.

45) The IEG suggests reinforcing the product line Work Processes and Equipment Development, where the demand is great and expected to increase in the future.

46) There appears to be a shortage of manpower in occupational health even though major efforts have been made in recent years. The IEG suggests that training in occupational health is even further expanded and that marketing of such training is improved.

47) The FIOH produces much written and web-based material. It is unclear if this material achieves the desired effects. The IEG suggests that an end-user survey of the information activities of the FIOH is performed.

9. Processes, technologies, human resources and finances

9.1 Processes

The vertical organization is responsible for the management of human and financial issues of the FIOH. The quality handbook describes the general management structures. The quality of several service products is assured by accredited processes. The new strategy and changed organizational structure required several internal development projects. One major new technical tool was the acquisition of an enterprise resource planning application called JOTI. It includes tools for human resources, finances, project management, sales and customer relation management. JOTI is aimed to achieve an integrated resource, cost and earnings management to support the strategic steering of activities and resources. JOTI was taken into use in January 2009.

Strategic management is carried out by the Executive Committee of the FIOH. Each of the seven Strategic Goals is assigned to one member, who is also responsible for a Centre of Expertise. Annual activity plans and reports are adapted to the performance agreements with the Ministry for Social Affairs and Health. This involves a four-year agreement of results with the annual adjustment and monitoring.

As discussed above, the FIOH has 22 strategic programmes to execute the seven Strategic Goals. About one third of the person-years are devoted to these programmes. Strategic programmes form project portfolios, the progress of which is assessed annually by the Executive Committee. Their operative resources come from the Centres of Expertise. Specific project process has been developed and renewed in 2008, and more than 200 projects apply the project process. Assistance is given by a project office having six part-time employees. JOTI also serves the management and reporting of projects.

Person-years attributed to different core functions of the FIOH are reported in the table below. It shows that the number and proportion of R&D personnel has increased since 2004 during the new strategy, while the number of service personnel has decreased.

	2004		**2005**		**2006**		**2007**		**2008**	
	person-years	%	person-years	%	person-years	%	person-years	%	person-years	%
Research	323	37	319	37	358	42	365	43	368	43
Service	356	40	326	38	301	35	294	34	291	34
Training	93	11	113	13	98	11	91	11	89	10
Information	110	12	93	11	105	12	107	12	107	12
Total	882	100	851	100	862	100	857	100	855	100

Demand-driven activities and tasks are organized as product lines, which in turn are divided into product families.

The IEG is impressed by the FIOH's process management. It seems to secure the high quality of management. The recently implemented JOTI system has met some doubts by the personnel, and it is advisable that the management is sensitive to these complaints, because there is the risk that the quality of JOTI information might be undermined if the personnel do not accept it.

The distribution of person-years during the new strategy has changed surprisingly little. The stronger orientation towards clients' needs might be expected to imply that services, training and information would get an increasing share of resources, while in reality it seems that research has increased its share. This is explained by the fact that the efficacy of service provision has improved by laboratory reorganization and other measures. The FIOH has also informed us that in research and development activities it is especially development which has got more resources, although there are no figures available to describe the trend.

The FIOH has achieved good results in various surveys measuring service quality and image. For example, in the MAINE survey (a survey that measures the FIOH's image among its interest groups) carried out in 2008 by the Ministry of Social Affairs and Health, the FIOH received a second best evaluation of its service quality out of 14 institutions working in the areas of the Ministry.

9.2 Technologies

The FIOH's strategy is based on an innovation chain model in order to address the most relevant issues in working life. According to this strategy, techniques, methods and expertise are needed to obtain information of a scientific nature on a strictly bounded segment defined by the strategy document and to produce practical solutions to the FIOH's clients and partners. For investment policy, the FIOH has grouped its technologies as a) *Cutting-edge technologies*; b) *Key technologies*; and c) *Infrastructure*. *Cutting-edge technologies* are the techniques, methods and expertise that the FIOH needs in order to obtain new scientific information about major problems and new risks in working life. *Key technologies* are the techniques, methods and expertise that the FIOH needs to obtain practical information and to produce solutions for the risks in Finnish working life.

Through state and project funding, the FIOH invests in the infrastructure and maintains laboratory facilities that enable simulation, visualization and experimental studies. The FIOH invests in the instrumentation of its product lines on the basis of cost correlation. The depreciations of the investments are taken into account in the pricing of the FIOH's products. The FIOH is going through the process of outsourcing several IT functions, such as service desk and server care. The focus of IT investments will be the needs of the FIOH's core processes. A reorganization plan of the chemistry and biomonitoring laboratories was put into action in 2007 to ensure a more efficient use of laboratory facilities. Laboratory analyses were concentrated, and the FIOH now has fewer laboratories. During the evaluation process it was made apparent that the laboratories capacity may be used to its maximum capacity and that there is demand for services in different regions where such services are not now offered. IEG commends the FIOH for the changes made to enhance efficiency in the use of laboratory facilities. It encourages the FIOH to continue to assess the efficiency of service provision across regions taking into account client needs.

Collaboration with national and international actors in the field of health and safety is a key in FIOH competence. Due to the utilization of cutting-edge technologies with high-quality equipment in research, the FIOH has become attractive to collaborators, both nationally and internationally. This increases the FIOH's possibilities to be in the fore-front of research in the FIOH's strategic focus research areas. Overall, the FIOH has excellent collaborations with different partners to achieve its goals.

9.3 Human resources

Person-years in the FIOH have declined somewhat from 2004. In 2008, women comprised 70 % and the average age of personnel was 46 years. The number of male and female superiors was fairly equal (men 57 %, women 43 %). State-funded person-years totalled to 72 % of the total. Of the staff, 27 % were working on a temporary basis.

There were a number of structural changes in 2008 that had a direct impact on FIOH employees and their well-being. The outsourcing of the ICT function reduced the workforce by 13 employees. Decisions on further restructuring concerning payroll services will probably affect three employees in the year 2010. The productivity programme of the government of Finland means a further reduction of FIOH staff. The IEG considers that the government productivity programme should not be applied to the staff funded by the FIOH's own income, because it would harm the FIOH's possibilities to meet demands and would put much extra pressure to the high level of workload of FIOH staff.

Turnover of permanent staff was 8 %, and employment lasted an average of 22 years. There has been an increase of staff turnover as expected in periods of organizational restructuring. Twenty-one employees retired, and the average retirement age was 63.8 years, which is above the national average retirement age of 60 years. The retirement of key staff has already been identified as a key issue and should continue to be addressed as a priority in the coming years. The IEG recommends that actions are put into place to ensure continuity of activities and knowledge (especially in relation to programmes such as entrepreneurs' health and maritime health), especially by involving and developing younger staff.

To facilitate the acquisition of quality new staff, the recruitment process at the FIOH was improved in a number of ways during the year 2008. Also, more attention was paid to the development of the FIOH's employer image e.g. among students and recently graduated.

Although sick leave decreased from the previous year's level, the longer sick leaves increased and together with disability pensions needs attention. The introduction of the new development programme TYÖTIE is in the right direction. The aim of this programme is to improve personnel's working ability and prevent long-lasting absenteeism due to sickness or other causes. Very crucial in this programme is to prepare the FIOH's supervisors to handle and solve difficult situations in their units. The FIOH should monitor the effectiveness of the programme.

A special emphasis of occupational health services at the FIOH is placed on preventive action and health promotion through health checks and risk assessment of the working environment. In 2008, the total number of accidents at the FIOH was 28 (31 in 2006 and 17 in 2007). A new near-miss incident reporting model was introduced to further improve safety at work by identifying beforehand situations that pose a risk.

The aims of the FIOH's human resource strategy are to ensure the availability of skilled and committed personnel needed by the FIOH, and to develop such human resource policies that allow utilizing the existing intellectual capital in achieving common goals. The level of education among FIOH employees is high. The Centres of Expertise maintain and develop the competence of their personnel. During the years 2007–2008, a model by means of identifying core competencies based on future needs was designed and piloted. A number of core competencies of each Centre of Expertise have been defined.

There was a significant structural change in 2006 that involved 16 departments integrating into six Centres of Expertise. This change affected staff well-being. The FIOH has considerable expertise in organizational restructuring and change. It would have been ideal for the FIOH to follow this change process and its effect on its own staff well-being but this was not put into place. Staff well-being should gain even more attention and build on the measures already taken such as development discussions and mentor programmes.

As a knowledge-based organization, the FIOH also promotes crucial common skills in many ways, such as business and client orientation, scientific approach, social and communicational skills and innovativeness. Training – both internal and external – amounted to 1.4% of paid working time in 2008. The number of training days per employee was 3.6 days which was virtually the same as in 2006 and 2007. During the years 2007-2008, two new training programmes for a Specialist Qualification in Leadership and Specialist vocational qualification of product developing at the FIOH where organized. The FIOH's focus in personnel training during the years 2009–2011 lies with work hygiene know-how as 30 % of work hygienists are retiring within the next five years. An internal training course has been developed to ensure a good level of work hygienic knowledge also in the future.

The Work Climate Questionnaire from 2006–2008 showed that the strengths of the FIOH are clear and well-recognized goals, opportunities to influence the content of one's work, meaningful work content, good leadership and teamwork together with inter-team collaboration. Opportunities for personal development were also considered good. However, there were also some challenges: organization of work in a way that prevents excessive strain on the personnel was seen as an important object of development. The low level of pay and practices of rewarding good work also received criticism. Workload had been identified as an important issue in the previous evaluation and still came up through this evaluation although things have improved in this area. It is proposed that the FIOH puts in place interventions to address work organization issues in order to reduce strain of staff. The IEG encourages the FIOH to ensure the recognition of good work and encouragement of staff for their efforts as appropriate.

9.4 Finances

FIOH expenditure between 2005 and 2008 has increased somewhat in nominal terms, and so has the income. However, government support has remained roughly at the same level, and therefore, its relative share has declined. This is due to the increase of own income, especially research and services have been financed increasingly with external sources, such as EU, Tekes (the Finnish Funding Agency for Technology and Innovation)**,** the Academy of Finland and the Finnish Work Environment Fund.

One third of research and development activities are financed by external sources (i.e. other than government support). Market based training is almost totally financed by income it produces, and so are market based services. The FIOH's service income has almost tripled in ten years.

Annual investments amount to 3.5–5.0 million Euros. On average, occupational hygiene and toxicology accounts for 33 %, occupational medicine, physiology and ergonomics 8 %, information technology 40 %, and premises and other general infrastructure 19 % of the total volume. The split of investments is appropriate in relation to FIOH activities. The share of

investments is 5–6 % of the FIOH's total expenses, showing a decline during recent years. The decline is due to the end of intensive investment in the premises and other general infrastructure, the execution of the laboratory rationalization plans, and the rearrangement of IT functions.

The proportion of development investment is on average 15–20 % of annual investments. Development investment refers to the acquisition of new technologies for the FIOH's needs. Rationalization investments refer to the acquisition of technologies which enable more efficient functions and processes, e.g. software applications and take nearly one third. Maintenance investments are updates and renewals of present equipment, and they account for 50–60 % of the volume of total investments. The level of investments is appropriate for FIOH activities.

The government grant covered about 57 % of expenditures in 2008. It means that 43 % is based on external sources. It is important to secure that activities financed by these external sources support the FIOH's mission and support.

The large share of external financial sources indicates that the FIOH is competitive in R&D markets, both internationally and nationally, being a proof of its quality. In service production this is not self-evidently the case, since in many services the FIOH has nearly a monopoly position. However, all service demands cannot be met, and the current interpretation of the governmental productivity programme prohibits the recruitment of new personnel to meet the demand.

9.5 Recommendations

The IEG commends the FIOH in relation to the organization of processes, technologies, human resources and finances. The FIOH is encouraged to take steps towards further improvement in relation to the following issues. The IEG is impressed by the systematic work the FIOH has done to modernize its processes and technologies and to adapt them to the new strategy. The FIOH has succeeded well in acquiring own income to compensate the standstill of the state grant.

48) The FIOH's process management is well-organized. It assures the quality of decisions and a systematic follow-up of the projects. However, it may not be the most rapid way to decide which projects are pursued and which are not. The possibilities to react more rapidly to the demands of the customers at all levels of administration should be considered.

49) The IEG commends the FIOH for the changes made to enhance the efficiency of the laboratory service provision and encourages the FIOH to continue to assess efficiency and be sensitive to client needs across regions.

50) The FIOH has identified the retirement of key staff as a priority and also the need to ensure continuity of activities and knowledge (e.g. in relation to key programmes such as entrepreneurs' health). The IEG encourages the FIOH to continue to address this issue, especially by involving and developing younger staff.

51) The FIOH has taken steps towards staff well-being, among them the introduction of the TYÖTIE programme. The IEG commends the FIOH for the steps taken so far and recommends that the FIOH monitors the effectiveness of the TYÖTIE programme in

order to improve personnel's working ability and prevent long-lasting absenteeism due to sickness or other causes. Staff well-being should continue to be given high attention building on the measures already taken.

52) The FIOH Work Climate survey is a useful tool for monitoring staff well-being. Building on recent results from the survey, the IEG recommends that the FIOH puts in place interventions to address work organization issues in order to reduce strain of staff.

53) Also on the basis of the Work Climate survey, the IEG encourages the FIOH to ensure the recognition of good work and encouragement of staff for their efforts as appropriate.

10. Finnish Institute of Occupational Health Regional Offices

10.1 Helsinki Regional Office

The Regional Office in Helsinki/Uusimaa has a staff of 30 persons who work in six different teams of the FIOH. The Office has a very large regional catchment area with 33 % of workplaces in Finland, 34 % of wage earners, 22 % of entrepreneurs and 47 % of the national income. The workers are younger, better educated and healthier and rate of their occupational hazards and illnesses is lower than in the areas of other Regional Offices.

The main task of the Office Director was described as that of a Marketing Director, to facilitate networking between the Helsinki Regional Office teams and customers as well as to find new contacts. He is also helping teams in start up phase of their projects and assists in applying new projects from the EU/REACH programme and planning training programmes with customers.

There is an internal Result Agreement with the Regional Offices in the FIOH, and the personnel of Helsinki Regional Office gave very detailed descriptions how the strategy and the MSAH's needs are fulfilled, implemented and followed up within the Office. Accordingly, the process starting from an idea of a research project – the initiative coming many times from customers and unions – proceeding to an evaluation of its relevance by the teams looked to be streamlined reasonably well in the Helsinki Regional Office/FIOH as a whole. The new strategy seemed to be well accepted and implemented.

The Helsinki Regional Office has a Regional Advisory Group consisting of 32 members. The Helsinki Regional Office has given to its activities a topic of "Uusimaa enterprises in competition of getting capable workforce". The Regional Office has created good contacts with important actors in Uusimaa (e.g. with the chains of big retail dealers like Stockmann, Tradeka, Kesko, Sokos) and is planning to develop such contacts further. The Advisory Group is not very willing to take stands on safety and health issue as such but they are eager to hear good presentations on the latest practices. The Advisory Group is very willing to participate in meetings if they are organized in connection with enterprise visits. Regional forums on occupational health issues might also be a good arrangement besides the national forum.

The relevance of the work at Helsinki Regional Office is illustrated by three examples concerning chemical factors, physical factors and indoor air.

Chemical factors

The Chemical factor team includes 40 persons. Their task is to promote practices of chemical safety and risk management and develop measurement methods. In the Helsinki region the team produces 300 expert opinions per year and runs three laboratories. It takes about one month to deliver services to the customers. Impact analysis is made after half a year by telephone interview on the implementation of the expert opinions. Annual turnover of Helsinki Regional Office is 2.2 million Euros of which 1.5 million Euros, 68 %, is reimbursement from the customers. The share of research from the total budget was 5 % in 2008 and is anticipated to rise to 13 % in 2009.

Physical factors

The Physical factors team employs 16 people in the Helsinki Regional Office region. The basic tasks cover issues like noise, vibration and ventilation. The biggest customer group is enterprises. Services are provided in a month. The team produces 250 expert opinions per year and participates in training and development projects. Implementation of the expert opinions is assessed by telephone interviews. The answers show that suggestions by the experts have been implemented in most of the cases. In 2008 the team published 45 scientific publications. Because of the high demand of services a separate bioaerosol and indoor air team with eight persons has been set up. However, at the moment there is half a year queue for service provision. Competitors are many but their services and competencies are more limited and interpretation of measurement results are asked from the Helsinki Regional Office. A strategic question for the Helsinki Regional Office is how to reorganize its work in the way that will satisfy the demand of the customers, staff resources and the agreed result targets of the FIOH.

Indoor air

The FIOH has recognized the importance and problems of the indoor air by setting up a special thematic area to tackle the issue. The theme group has been built on the expert work done in the Helsinki Regional Office and other Regional Offices. The theme group has produced a number of reports on indoor air problems especially in restaurants and hospitals and developed methods for indoor air management. The main message is that the FIOH and the ministries have to have a comprehensive approach, which combines all actors and will have systemic impact on indoor air issues.

Part of the projects and the daily work of the Helsinki Regional Office derive from time before the new strategy was decided but it looked like the staff is willing to implement the new strategy as a positive and needed change instead of the old structure. The vicinity of the Regional Office to the FIOH Headquarters is very helpful in the daily work of the Helsinki Regional Office. The need to travel is minor compared to the other Regional Offices.

Discussions with some of the Helsinki Regional Office team members show that the employees have a very enthusiastic and dynamic approach to work. There is more demand on skills and know-how than resources to provide services. Implementation of the results is efficient. Motivation to work comes from good feedback and challenges to put measurement results into more holistic perspective and develop new methods.

There were seven laboratories earlier in the field of environmental measurements in Helsinki Regional Office, but now only three remain. The samples that cannot be analyzed locally are sent by mail, which functions well. The waiting times are in general are not too long at the Office, but the environmental assessment capability is too restricted and waiting times very long, even months. Customer satisfaction is regularly measured with surveys, and results have been very positive.

In the near future it would be important to think about the work and task sharing between the FIOH headquarters and the Helsinki Regional Office because in the Helsinki Regional Office they have a know-how to wider approach and development. This seems like an operational efficiency issue

10.1.1 Recommendations

54) The Helsinki Regional Office has well-working and highly competent collaborators with holistic touch on problems. One example is the indoor air team with its systemic approach. A strategic question for the FIOH and the Helsinki Regional Office is how to find similar comprehensive approaches in other teams. The IEG suggests that this model is applied to other teams as well.

55) The Helsinki Regional Office has a great demand for measurement and for interpretation of the measurement results. It is important for the Helsinki Regional Office to find a balance between these two functions taking into account customer needs and staff resources.

56) Customer satisfaction is vital for successful work of the Helsinki Regional Office. That is why it is recommended to continue existing feedback and networking methods and to develop new fora for cooperation and information distribution.

57) The Helsinki Regional Office has good know-how and efficiency to wider approach and development which would give good opportunities to think about the work and task sharing between the FIOH headquarters and the Helsinki Regional Office.

10.2 Kuopio Regional Office

The Regional Office in Kuopio is the largest FIOH Regional Office. It has a staff of 72 people who work on 18 different FIOH teams. The Office is responsible for a population of approximately 500.000 people. Functionally, the Office has a primary role in coordinating occupational health services and particularly, in analysis of workplace monitoring for biological and physical agents. The Office also focuses on the organization of work, ergonomics, and small enterprises. Sectorally, the Office is responsible for agriculture, forestry, biotechnology, and waste handling.

The work of the Kuopio Regional Office is highly relevant to the Strategic Goals of the FIOH. The Kuopio Regional Office provides an effective means for delivering information, guidance, and service to a large segment of the Finnish population. It serves to translate research throughout the Institute to address important sectoral occupational safety and health issues. Its particular focus on work organization has enabled it to provide useful consultations, interventions, and training. This has resulted in between 0.7–0.9 million Euros in income for

each of the last three years. Similarly, the conduct of analyses of workplace samples of biological physical agents and chemical agents has been a major and relevant source of income.

The consistently high demand for the services of the Kuopio Regional Office is one indicator of the quality of the work performed there. Additionally, surveys of customers indicated a high degree of satisfaction.

The adoption of the Strategic Goals of the FIOH is proceeding at this Regional Office. However, finding a way to translate everyday work into strategic goals has been difficult. The linkage between regional projects and the FIOH's Strategic Goals still needs attention.

Since the reorganization in 2006, there has been a progression towards a new way of operating in the Kuopio Regional Office with a focus on cross-institute teams and a matrix approach to management of resources. This requires staff and management to learn new roles and ways of functioning. This has been difficult and has taken time. However, there is evidence that this transition has been successful in the Kuopio Office with a strong emphasis on networking in the region, cooperation with various universities, and the delivery of services to clients. There is a strong Regional Advisory Group that focuses on issues of importance to the region but its working methods could be developed further.

The staff of the Kuopio Regional Office appears to have adapted well to its new role and feel more integrated into the FIOH now than before the transition. Since they have national responsibilities in occupational health services, their focus is broad. They have moved to addressing not only research and service implementation but also the impact of these efforts. The integration of the Regional Office into the whole of the FIOH has required increased staff travel time.

The Kuopio Office has been the hub of a regional network that has played a major role in the health of workers in the region. The effectiveness of this Office can ultimately be assessed by the growing coverage of occupational services and by the decrease in workplace accidents. In the interim, the growing use of services, training, and interventions is an indicator of progress towards the ultimate goal of risk reduction.

Two cases illustrate the impact of this Regional Office.

Partnership with the University of Kuopio in occupational health training

The Regional Office has a strong and proactive relationship with the local University. It provides occupational health training and responds to requests from the University for information and consultation. There are also shared professorships in occupational health and partnership in research.

Indoor air – Moisture damaged buildings

Exposure to biological agents from moisture in buildings is a growing problem to workers and the general public in Finland. Kuopio Regional Office scientists have made major contributions to addressing this problem by developing multidisciplinary indoor air surveys. The surveys are used to diagnose structural damage and to determine quantitative and

qualitative exposure to biological contaminants. They conduct approximately 40 surveys/year which lead to improvements of the working conditions for thousands of workers.

10.2.1 Recommendations

The Kuopio Regional Office contributes to the overall effectiveness of the FIOH and its local impact. The contribution of the Regional Office is significant and the following recommendations may help its impact to continue to grow even further:

58) The Kuopio Regional Office should continue to develop strategies to market the FIOH services to small enterprises. This effort should be coordinated with those planning the programmes under the Strategic Goal *The management of occupational health hazards at work as part of management practices and corporate risk management*.

59) The Kuopio Regional Office should continue to enhance the interactions with the regional Advisory Board to support the Strategic Goals of the FIOH and refine the priorities of the Regional Office.

10.3 Lappeenranta Regional Office

The Regional Office in Lappeenranta has a staff of 22 people who work in ten national teams. The Office is responsible for a population of almost half a million and 20.000 enterprises with employees totalling more than 200.000. The Lappeenranta region has the second highest figures of occupational diseases, work-related accidents and sickness absenteeism days among the FIOH regions. The most typical problems revolve around old traditional work accidents especially in the construction, metal and paper industries. Occupational diseases are distributed equally into noise problems, stress diseases, respiration disorders, skin diseases and asbestos diseases.

The Lappeenranta Regional Office Advisory Group has a joint view that the Regional Office possesses a highly respected and authoritative position in safety and health affairs as well as working life development in the region. It is commendable that the Office gathers information from the latest research reports and disseminates them in an easy to read form on its website. The Regional Office is an appreciated centre for working life development and networking bringing research results in easily digested form to workplaces. The Office is also a training and know-how centre and organizes important annual events with high quality presentations and benchmarked results. The Regional Director as the main “ambassador” for the office has played an important role in the marketing of services and networking with customers.

The previous assessment was done by the Advisory Group, which was comprised of 18 members with the same number of deputy members then creating a balanced combination of regional actors from such organizations as Lappeenranta University of Technology, labour market organizations, county authorities, regional councils and influential enterprises. The Group does have annual meetings but their joint view was that all of the members should allocate more time for advisory group work. Especially important would be to disseminate services of the Regional Offices, develop a forum for all partners and get SMEs interested in safety and health issues. It is important to pay attention to newly emerging safety issues but at

the same time also important to stress the importance of developing traditional safety and health work.

When speaking about team work, personnel in Lappeenranta shared a view that teams were as of yet young, developing few “good practices”. Lappeenranta participates in 10 of the 40 FIOH teams. Team members are “ambassadors for their own teams” in the region but at the same time there exists a great need for information from other teams, their work and results. Work safety was mentioned as an area where the Lappeenranta Regional Office team lacks participation, even though the region’s work safety problems are the most common causes behind sickness absenteeism days.

The IEG had the impression that Office team members were isolated in their offices and would need help and better contact with other team members. Working in pairs helps the situation but team meetings are only held once or twice per month. This cannot replace the importance of daily contact between older and younger members. Travelling takes too much time when everybody is typically busy with their own projects. Organizational flexibility is difficult to achieve and promotion of multi-professionalism a challenge. An example of this is the analysis of mould and indoor air. There exists a great demand on that service but only two people are available. Balancing services and other activities is a strategic issue.

The Centres of Expertise have one or two meetings annually to discuss major issues related to the centres’ work including reports on progress of ongoing team projects, proposals for new projects and on general team targets. Result discussions are organized 2–3 times annually with team researchers. This system was considered good. Apart from internal evaluations there should be outside evaluations as well, for example customer surveys on the local level.

The paper industry’s customer evaluation on the Lappeenranta Regional Office work was very positive. In the evaluation work hygiene measurements were considered to work particularly well. A few bigger companies like UPM have a specially nominated contact person in the Lappeenranta Regional Office. This system works well and could be applied to other companies. In the paper industry there is still a great need for traditional dust, noise, vibration, high temperature, chemicals and air ventilation measurements. The Lappeenranta Regional Office’s knowledge of the forest and paper cluster is more than adequate and networking within this area works well. Further training services should be provided. Cooperation between the companies and the Lappeenranta Regional Office regarding research has produced valuable documents like the Wood Dust or Development book regarding workers in the factory. Support for changing processes in factories has been important but even more so now due to the ongoing globalization process. After the reorganization of the Lappeenranta Regional Office cooperation with the Helsinki FIOH Headquarters is working better but “stars” from Helsinki should visit more often in the regions.

10.3.1 Recommendations

The team organization has been adopted quite successfully after the first phase of the reorganization. Teams are enthusiastically involved in their work but the number of team members in each national team is very small. A challenge is to concentrate on the most relevant issues related to the regional health and safety problems.

60) The Advisory Group is very favourable in relation to the ongoing activities of the Lappeenranta Regional Office. This view was supported by the customer impact and societal usefulness analysis. Critical views concentrated on available service resources of the Lappeenranta Regional Office which were considered insufficient to provide needed services. The IEG commends the successful cooperation with the Advisory Group to analyze future needs. It is also important to keep in mind the region's high numbers of traditional safety and health problems. By putting more resources on these the Lappeenranta Regional Office can increase its added value for employees and enterprises.

61) The Director acts as a "main ambassador" for marketing and networking services, activities, training courses and development projects to customers. The Director also supports teams in their activities. According to assessments this has been done very well in the Lappeenranta Regional Office. Besides this, another important issue of the manager is to support and develop multi-professionalism and flexibility of the staff. A recommendation is to consider the strategic choices of the Lappeenranta Regional Office: how to balance services and other activities of the Lappeenranta Regional Office taking into account the customer satisfaction and staff resources as well as the FIOH Strategic Goals.

10.4 Oulu Regional Office

The Oulu Regional Office covers northern Finland, including Lapland, accounting for only 12 % of the Finnish population, but about half of the land area of Finland. There are 59 staff members working in 22 FIOH Teams, and one Team Leader. The Oulu Regional Office specializes in research, expert services, training, and dissemination of information in the Security and Safety Branch, with a focus on work in cold climates and the safety of rescue personnel; work in metallurgy and mining; and research that further develops the Nordic Cohort Study. The Oulu Regional Office has strong partnerships with the University of Oulu, the Oulu Mining School, the National Public Health Institute and Oulu University Hospital, as well as industry, the health sector, and organizations of employers and employees.

A 2007–2009 joint Russian-Lapland Cooperation piloted training materials at a polytechnic education level. Cooperation with Oulu Mining School involves teaching by FIOH staff, as well as cooperation in new mining research projects. A national mining industry project entitled Safety and Security Enhancing Well-being at Mining Work was initiated in 2007. This project provides services and training for large mining companies, including health and safety in mines and also dealing with working life mental health.

Work at Oulu with the Finnish Defence Forces goes back to the late 1980's, beginning with consultation with the FIOH for frostbite of toes. FIOH research of high quality on work in cold climates, greatly in partnership with the Finnish Defence Forces, has grown substantially over the years. A new area of heat research has been triggered with the recent sending of Finnish soldiers to the hot climate of Chad.

FIOH research and solutions for working in the cold are highly valued internationally. The Team leader for the FIOH *Physical work capacity team* resides in the Oulu Office. The FIOH is the only entity in Finland that studies occupational health and safety in extreme weather conditions. Recent enhancements of the cold research have included extension to safety and security branches beyond the military. Occupations studied or trained since 2005 include food

processing workers, fire and rescue aircraft mechanics, farmers, miners, reindeer herders and occupational health care workers. New Nordic and broader international development projects are underway to bring together cold-related human resources and to increase service offerings. The new work being stimulated by the sending of Finnish Defence Forces into the hot climate of Chad can contribute to the global need to better understand risks and solutions for workers working in hot climates as global warming increases.

FIOH researchers contributed to the development of a new ISO Standard ISO15743 (2008) *Ergonomics of the thermal environment – Cold workplaces – Risk assessment and management*. This is a highly commendable achievement as ISO Standards influence improved health and safety globally.

Unique cohorts studied at Oulu, by FIOH Centres, and by university partners include the Health 2000 National Study of 10.000 persons, the Young Finns study 1980–2007, the Northern Finland Birth Cohort of 1966 and the Oulu Back study of 1986. Numerous scientific publications, Ph.D. theses and practical guides have resulted especially from work in the cold and from the Nordic cohort studies. Periodic updating of the cohort studies provides the research evidence regarding aspects of the Finnish population that make possible the planning of interventions.

A visit to an Occupational Health Service Consulting Company illustrated the healthy future of partnerships in the Oulu region. Joint projects and collaborations in education of occupational health professionals, of projects in rehabilitation services and with a network of occupational health services are successfully underway.

The services to clients in the region continue to be highly valued. The view was expressed by clients and partners that trust in the FIOH has always been high, and remains high following the institutional change. The Director of the Centre of Military Medicine, who has worked many years with the FIOH, noted that the recent institutional change allows for client requests to the entire Institute and that the ease of specialized consultations is of great value to clients. Appreciation was expressed by stakeholders for the institutional change in the FIOH that integrates the Regional Offices into mainstream FIOH. Presenters from the mining stakeholder groups expressed respect and enthusiasm for the Oulu staff working with them in their activities, many of which are new and related to the opening of mines in northern Finland.

Discussions with Oulu staff indicated that overall adaptation to the new organization has been successful. Partnering is easier, and there is a sense of enthusiasm with the integration into the FIOH due to Team membership. There is a view that, overall, the reorganization has brought added value to the FIOH. Still needing solutions are some bureaucratic difficulties encountered by FIOH staff, including large numbers of meetings and e-mails, difficulties of travel, and a complex JOTI electronic management system. Video meetings are useful, but interest was expressed also for computer-based meetings.

10.4.1 Recommendations

62) The IEG commends the Oulu Regional Office on the outstanding research and solutions for cold climates and encourages further development of research and solutions for workers in both cold and hot climates.

63) The IEG encourages the Oulu Regional Office to continue its research, teaching and service with partners on mining and metals.

64) The IEG values the knowledge gained from and encourages continuing the exploitation of the unique Nordic Birth cohort studies.

10.5 Tampere Regional Office

In terms of the number of personnel, the Tampere Regional Office is the second largest Regional Office of the FIOH, employing 68 people. The size allows a many-sided professional structure of the personnel, as well as a critical mass of expertise. Countrywide, the Tampere Regional Office conducts research and services in addition to services in the region. In terms of industrial sectors, the Tampere Regional Office is specialized in construction and food industries.

Customer oriented services include various kinds of work environment problems, occupational medicine, ergonomics, organizational psychology. Annually, it provides e.g. 250 work environment reports, 6.000 student days in training, 400 patient visits.

The activities of occupational medicine in the Tampere Regional Office include service, education and research. The out-patient clinic of occupational medicine is located at Tampere University Hospital, and is having about 400 patients per year. The Tampere Regional Office takes care of the education of four physicians specializing in occupational medicine, and gives training in occupational health at various levels. Some scientific research projects focusing on occupational health risks are on the agenda.

The Tampere Regional Office is responsible for the occupational safety training provided by the FIOH. It provides different levels of training for safety manages of the Finnish workplaces.

The Tampere Regional Office is nationally responsible for the FIOH's cooperation with occupational safety and health administrative bodies in Finland. This is certainly made easier by the fact that the Department of Occupational Safety and Health of the Ministry of Social Affairs and Health is partly located in the same building and the Regional Office, as is the Regional Safety and Health Inspectorate.

The Tampere Regional Office felt that the Office had been involved in the reorganization process as well as in the process leading to the reform of the FIOH's strategy. It was felt that the current strategy has a positive impact on their daily work.

The Occupational Safety Unit of the Ministry has a very positive view of the services which the FIOH provides to occupational safety administration. The FIOH is seen to have a very important role of information production and distribution, and the FIOH has met the demands of the Unit well. The Ministry priority areas are to promote mental health, to prevent Musculoskeletal Disorders and to prevent occupational accidents. The Unit considers these topics to be well addressed by the FIOH and in general are supportive of the chosen Strategic Goals for this strategy period.

The Labour inspection authorities are satisfied with the renewed training of labour inspectors provided by the FIOH, but were critical to long delay in safety survey services.

The IEG wishes to emphasize the importance of training of the safety shop floor personnel because in small and medium-sized enterprises they are often the only personnel present at all times to deal with health and safety issues. Raising the competence of such personnel is therefore important. The training courses are being renewed continuously and new emerging topics are included which is appreciated by the IEG. The Tampere Office was considering to also including courses for neighbouring disciplines such as human resources. The IEG thinks that such an addition would help the implementation of Occupational Safety and Health topics and appreciation of the interaction with HR policies in companies by the Occupational Safety and Health professionals and thus would welcome such additions.

Following the recommendation of the FIOH's evaluation in 2004 to improve the integration of Regional Institutions in the FIOH, regional institutions have been reorganized into Regional Offices. The Regional Director is a representative of FIOH management in the Local Office, and he/she has an internal coordination group in the Regional Office to manage the internal work as well as the regional activities. The superiors of the employees might thus work in Helsinki or in other Regional Offices, and vice versa.

While this structure may seem quite complicated, with modern communication technologies it is not necessarily ineffective. The experience of the reorganization in Tampere has been a positive one. The disadvantage of the more complicated communication is counterbalanced by enhanced integration in the main organization and the increased possibility to engage experts from the other Offices. The matrix organization has improved cooperation with others and other locations. Also internally, the interaction of 24 teams is working well, although some employees do not always appreciate the increased complexity.

The Tampere Office seems to meet the regional needs fairly well. Waiting times have decreased but some queues exist still particularly in indoor climate services. However, the delivery time of the reports is quite often delayed. In our interview with the Labour inspection authorities they explicitly expressed their concern about this and indicated that the occupational hygiene services from the FIOH did not meet their expectation. The quality is excellent, but the service is often delayed and reports are not delivered in due time. This is an important issue since there is hardly anyone else to turn to in (complicated) occupational hygiene issues. Labour inspection had the impression that the FIOH needs more personnel to serve them, and the FIOH should prioritize practical service production rather than research.

The Tampere Regional Office has not had problems in getting experts from other regions, when they needed them. This ability to use experts from other locations for the region has actually improved after the reorganization. Services are rightly regarded as important not only to customers but also to the Regional Office to maintain contact and interaction with the workplaces.

It was not fully clear how the prioritisation and allocation of projects took place other than that any good idea as long as it could be financed from external or internal sources was welcomed.

Like all Regional Offices, the Tampere Office has a Regional Advisory Group, which meets two to three times per year. It provides a forum where occupational health issues of the region can be discussed. Tampere has an advantage of being the home of many organizations working with occupational safety and health issues (the Department for Occupational Safety and Health, the Regional Occupational Safety and Health Inspectorate, the FIOH's Regional Office, Tampere University of Technology with, especially, its safety management and

planning, the Technical Research Centre of Finland (VTT), the Safety Technology Authority, the University of Tampere, especially its Public Health Institute). It seems that these collaborators consider the FIOH's Regional Office an important agent in the advancement of occupational safety and health. They would welcome an even further pro-active attitude of the FIOH to initiate joint knowledge development and coordinate the activities in this field in the Tampere area. More exchange of staff could in their view facilitate such a process.

The Department of Occupational Health at the University of Tampere is satisfied with the current division of tasks including their role in training of the occupational health specialists.

However, the FIOH's ability to be a partner in research projects, especially those serving industries, is not at the level it could be. In the FIOH, the decision-making process and the bureaucracy in order to decide on joining a consortium and preparing the project proposals sometimes takes too long. Their partners in that respect would appreciate a faster and earlier answer whether they participate or not as not to miss important projects.

10.5.1 Recommendations

65) The Labour Inspection Authority appreciates the training the FIOH provides for inspectors. However, in daily inspection activities, inspectors have often an acute need of service. The FIOH has problems meeting demands of urgency. We therefore recommend that the FIOH and the Labour Inspection Authorities define jointly the legitimate service expectations including waiting periods so that both parties know what the FIOH service promises are.

10.6 Turku Regional Office

The Turku Regional Office has a staff of 50 persons, among them 3 team leaders, who work in 14 different FIOH teams. The Regional Office is responsible for the south-western part of Finland where there are 720.000 inhabitants and 356.000 employees. A unique characteristic of the region is the archipelago with 32.000 inhabitants and 2.000 enterprises. Although traditionally the focus of the Turku Regional Office has been on ship building and seafarers' health, there is now a strong focus on the municipal sector, including health care and social services.

Turku staff has expertise in 14 different disciplines related to occupational safety and health and well-being. Apart from the above areas of focus, Turku also hosts the Unit of Excellence for Psychosocial Factors and indoor environment laboratories. The chemical laboratory focuses on the analysis of thermal degradation products of materials and on sensitizing agents in air, materials and biological samples. Experts in the Regional Office are conducting all basic occupational hygiene, ergonomics and psychological strain services produced by the FIOH for regional organizations and enterprises.

There is strong collaboration with the universities of Jyväskylä, Kuopio and Turku and in Helsinki with the Department of Public Health. There are three joint professorships in Turku between the FIOH and universities in the areas of occupational health, toxicology and public health/epidemiology. There are plans for the development of a Turku Centre for Labour Studies (where the Turku Regional Office will participate). This centre will conduct research

and provide training and education. There is also collaboration with the public sector (municipalities, hospitals and centres of technology) as well as with the private sector, trade union organizations and occupational health care units and Health and Safety Inspectorates.

Unit of Excellence for Psychosocial Factors

The Unit sustains many international collaborations in the United Kingdom, France and Sweden as well as national collaborations. It conducts the Finnish Public Sector Study that includes employees from ten towns, six hospital districts and covers nearly one third of specialized health care. Its high level research is internationally acknowledged and has resulted in major scientific results that have been published in a number of scientific journals. This research has clear policy relevance and through collaboration with hospitals and public sector organizations the results are used for strategic planning and for the development of interventions. Other FIOH teams have also used the results for the development of training, interventions and products.

Work in health care and social services

The team's activities aim at the production and supply of information on the working conditions and well-being of the staff in the health care and social services sector. Such information should facilitate decision-making, support the development and training in the field and improve work organizations and environment. One focus has been work in elderly care and the Nurses' Early Exit study. Through the implementation of the FIOH innovation model, partnerships have been developed, research has been conducted and its results have been used to provide training and expert services and develop products and solutions for clients. Recommendations for education in nursing schools have been developed as well as training on the Ergonomic Patient Handling Card/Passport.

Maritime Health

There has been long and wide knowledge in maritime occupational health in Turku that has focused on work and life on board, fitness for work at ease and medical certificates, health promotion and training of doctors and seafarers. Statements on individual seafarer's ability for work at sea and archives of seamen's medical certificates are legal tasks for the FIOH. The team has strong international collaborations. It delivers training and has produced a medical handbook for seafarers and implements interventions.

Entrepreneurs' health and well-being

Most Finnish enterprises are small and medium-sized enterprises, accounting for 99.8% of the total number of enterprises. They employ most of the Finnish workforce. However, occupational health coverage is limited. Since 1995, the Healthier Entrepreneur-Healthier Enterprise programme has been implemented and a number of projects have been pursued. Tools and models to promote OSH in small and medium-sized enterprises have been developed and disseminated in collaboration with regional health provider networks.

The activities carried out in the Turku Office are directly relevant to both the FIOH mission and the Ministry priorities as they address many important areas. Especially relevant are the programmes on psychosocial factors, occupational health services in municipalities, social services, health care and SMEs.

The problem of key staff retirement was identified in the previous evaluation and is also topical now. It is important that key programmes of the Turku Office do not vanish (such as the one on entrepreneurs' health). Lack of staff in key areas has also again been identified as an issue, especially as concerns occupational health physicians and nurses and the training provided to occupational health personnel in the region.

The Turku Regional Office effectively delivers information, guidance, and service to a large segment of the Finnish population. It addresses several key areas and conducts high level research and interventions in different sectors. It hosts state of the art laboratories that serve increasing client needs. It sustains important collaboration networks in the region and has played a major role in the health of workers in the region. In the previous evaluation, it was suggested that a client survey measuring client satisfaction and expectations concerning its services should be conducted. The Turku Office has conducted some surveys and is now working actively to develop well-being profiles in the region and to anticipate client needs. The emphasis is on networking in the region and delivery of services to clients. The Regional Advisory Group is providing valuable input into issues of importance to the region. Stakeholders reported that the Turku Office has high credibility but the business aspect of using the services, tools and methods available should be stressed more to clients.

The adoption of the Strategic Goals of the FIOH has worked well at this Regional Office. The staff of the Turku Regional Office has adapted to the FIOH reorganization well and is meeting the Strategic Goals. Opinions are now expressed much more openly and things are continuously improving. One reported problem is the bigger administrative load and its impact on customer-focused activities. However, there is high commitment of the staff to the responsibilities of the FIOH. There are areas where lack of staff has an impact on service provision, notably as concerns occupational health care physicians. This also impacts on training of occupational health personnel in the region and keeping contacts with occupational health care units.

10.6.1 Recommendations

The IEG commends the Turku Regional Office for the development and implementation of a number of impressive programmes that address several key areas in collaboration with diverse networks in the region. The activities carried out in the Turku Office are directly relevant to both the FIOH mission and the Ministry priorities as they address many important areas. Especially relevant are the programmes on psychosocial factors, occupational health services in municipalities, social services, health care and SMEs.

66) The Turku Regional Office, as other FIOH Offices, is responsible for a large number of small and medium-sized enterprises, also spreading across the archipelago region. The IEG commends the Turku Office for the development and implementation of programmes that address small and medium-sized enterprises and entrepreneurs' health. It is recommended that resource availability is considered in light of staff retirement in order to address small and medium-sized enterprises needs.

67) The FIOH has already identified the lack of occupational health physicians and nurses in the Turku Regional Office. This has been confirmed by the current evaluation. This has an impact on training of occupational health personnel in the region, and also on the provision of quality occupational health services. This problem may not be restricted to

the Turku region and may not be a responsibility of the FIOH. However, the FIOH should consider increasing the activities in training of occupational health physicians.

11. Complete list of recommendations by the International Evaluation Group

General review of the Finnish Institute of Occupational Health

1) The performance targets for the FIOH are very general and may reflect the trust put into the FIOH by the MSAH. However, it is obvious that many of the performance targets would involve many other actors as well. The IEG recommends that performance targets for the FIOH, as stated in the agreement with the MSAH are more short-term and achievable by the FIOH's activities. Qualitative strategic goals might be considered in the next agreement.

2) The FIOH has been very successful in attracting external funds and incomes from services. It does not seem logical that government funds and funds from external sources and services are handled in the same way. The IEG recommends that the external service activity of the FIOH be exempt from the government productivity programme. The IEG has the opinion that the government productivity programme has severe unintended consequences for the FIOH's ability to meet the demand of its services. Therefore, the programme should take into account only that part of the employment which is financed by government grant. However, the FIOH should be aware that in the long run this may have a negative side-effect of increasing financing of external sources to the extent that the FIOH's ability to contribute to the strategy of the Ministry of Social Affairs and Health is endangered.

3) The FIOH appears to be well aware of the significance of occupational health for the individual's health as a whole and the IEG commends the FIOH on its holistic perspective in this regard. Many issues in health are related both to occupation and to the society outside the workplace. Such issues are partly covered at the FIOH and partly at the National Institute for Health and Welfare (THL). The IEG recommends that a strategic plan for the cooperation between the THL and the FIOH is elaborated and agreed upon.

4) The FIOH already has several projects in relation to the elderly at work, and they are important both for the individual and Finnish society. However, these projects could be complemented with more activities in relation to migrants and their involvement in work life. At present the FIOH has a project on equal treatment but there are also other aspects to be covered if equity in relation to cultural background is to be achieved. It is important that such projects focus on the needs both of refugees and of labour immigrants.

5) The FIOH has expertise and programmes on mental health in its different Centres of Expertise. The IEG proposes that the FIOH experts across centres collaborate to

achieve greater impact as concerns research and the development of skills and methods for the promotion of mental health at the workplace.

6) It is important for the FIOH to have credibility among the partners in the labour market. The IEG would recommend that the FIOH conducts a survey among labour market parties to establish what expectations they would have on the FIOH in future.

7) The concept of the innovation chain is valuable. However, the implementation of innovations appears to be the weak link in the chain. Therefore, the IEG suggests that the FIOH consider establishing a new unit or theme focusing on implementation research.

8) The FIOH does not appear to have used the full benefits in modern information and communication technology (ICT). The FIOH should increase its infrastructure, ambitions and competence in ICT.

9) The FIOH has rightly identified the retirement of key staff as a priority and also the need to ensure continuity of activities and knowledge (e.g. in relation to key programmes such as entrepreneurs' health). The IEG encourages the FIOH to continue to address the retirement and recruitment issue.

10) The FIOH has taken steps towards staff well-being, among them the introduction of the TYÖTIE programme, and mentoring. The IEG commends the FIOH for the steps taken so far and recommends that the FIOH monitors the effectiveness of the actions taken in order to improve personnel's working ability and prevent long-lasting absenteeism due to sickness or other causes. Staff well-being should continue to be given high attention building on the measures already taken.

11) The FIOH is advised to develop a group responsible for caring for FIOH staff in their continuing adaptation to the new matrix system, so that bureaucratic difficulties are reduced, the quality of work life continues to be enhanced, and the efficiency of productive work continues to be increased. This group should pay special attention to the needs of FIOH staff in the Regional Offices, who express enthusiasm about the integration of the Regional Office staff into a unified FIOH, but note extra hurdles that should be remedied by FIOH leadership.

12) The FIOH should increase its visibility in the Finnish society. There already is good collaboration with different networks in the regions but the services and products available should be marketed more in a businesslike manner.

13) The Aimed Impact Statements developed by the FIOH for each Strategic Goal provide valuable insights into the intent of the Strategic Goal. The IEG recommends expanding beyond Aimed Impact statements to include specific performance measures/indicators of success that can be used in evaluation of impact on health and safety and/or work ability.

14) The FIOH should develop an effort to enhance management of the organization matrix. This effort should focus further on the mechanics involved in accountability, staff recognition, decision-making, and resource allocations.

15) The FIOH should develop a comprehensive plan toward increasing productivity in Finland's workers by prevention of occupational health problems that reduce a

worker's ability to function. This plan should focus on ageing workers but also on new workers.

16) Contacts with partners are important for the area of occupational health. Taking into account the importance and size of the labour inspector organization, it would be valuable to develop well-functioning cooperation between the FIOH and the labour inspector organization for development of healthier, safer and better functioning working life in the productive environment.

17) Regional Office reports indicate that in many areas there is more demand for services than Offices can provide. Taking into account high demand on services internal work sharing in the Regional Offices and between the FIOH and Regional Offices should be discussed as well as which of the work could be outsourced or to accredited external partners.

Responsiveness of the Finnish Institute of Occupational Health to the recommendations of the 2004 Evaluation

18) The 2004 IEG recommended that the FIOH consider sharing information widely, particularly addressing the needs and barriers (e.g. cost) of small enterprises and entrepreneurs. The FIOH is in the process of transforming its website for easy usability and to make information widely available. The 2009 IEG strongly recommends continuing expansion of these efforts to reach this important group constituting a majority of workplaces in Finland. We encourage evaluation of the use and usefulness of information, products, and training, and of the impact on health, safety, and quality of work life.

19) The 2004 IEG identified work overload of dedicated FIOH staff as an issue needing attention. The 2009 review of the FIOH applauds the approach taken by the FIOH first to ascertain and address the needs of clients, while involving FIOH staff in all aspects. It is now appropriate to address this issue in a supportive context. Interviews indicate general approval about the new FIOH, but also a bureaucratic complexity, too many meetings, an unfriendly electronic JOTI management system, and the absence of a FIOH internal advisory group recognized by employees as seeking their views, worries and suggestions. The IEG recommends that the FIOH creates a group to care for the staff needs, to reduce hurdles of functioning in the new matrix organization, and to assist staff to achieve a balanced working life.

Relationship between Strategic Goals and organizational structure

20) The reorganization of the FIOH still is in an early phase and further efforts towards full implementation are needed. The IEG suggests strengthening the orientation of all organizational units towards contributing to the Strategic Goals.

21) The IEG suggests that the FIOH maintains the thematic areas, because they are an effective vehicle to transfer FIOH knowledge to solutions for the actual societal

problems. The IEG likes to compliment the FIOH to the efforts they have attributed to establish a partner network of all relevant stakeholders in the themes. The IEG suggests that even more effort with communication and support of advisory skills could be invested to increase impact and visibility of the themes, thus illustrating the importance of the FIOH's contribution to solving the societal problems.

22) The IEG favours the Units of Excellence. The IEG is impressed that the Units have established an internationally leading scientific position on topics of high relevance for healthy and productive working life in a fairly short period of time. The Units of Excellence deal with demand-driven research questions in a problem-oriented way, which in that sense is not what is the case in a university. In addition the Units of Excellence provide the FIOH with the possibility to keep operating at the international (scientific) podium and to attract new top talent. It is important for the FIOH to keep up this high profile to serve the credibility in society. It is also important to have a clear view on the long-term contribution of the Units of Excellence to the FIOH's Strategic Goals. With respect to their primary role in obtaining scientific excellence, this may result in formulating long-term societal impact targets and a road map towards that end goal, which can be built in the evaluation procedure of the Units. The IEG suggests that the internal transfer of knowledge of the Units of Excellence to other teams is enhanced.

Strategic Goal 1: The management of occupational health hazards at work as part of management practices and corporate risk management

23) The FIOH should conduct additional research on how employers get and use occupational safety and health information. This should include research on organization dynamics and decision-making.

24) The FIOH should expand its research efforts to identify and develop innovative ways to reach and motivate small business decision-makers.

Strategic Goal 2: Innovative, regenerative and healthy work communities

25) The FIOH is to be commended on the diversity and quality of its research programmes in relation to work organization and well-being. The IEG recommends that the FIOH educates occupational health services on results, methods and tools regarding this topic in the Occupational Health Services training courses.

26) The FIOH has impressive expertise, research and methods in the area of intervention studies to promote well-being at work. The IEG encourages the FIOH to continue in this area conducting more intervention and evaluation research and also further expanding its work on the cost-effectiveness of interventions.

27) The FIOH has also been active in research in relation to change and restructuring. The IEG recommends that the FIOH further develops its own expertise in anticipating change and meeting challenges as quickly as possible.

Strategic Goal 3: Each citizen equipped to ensure his or her occupational safety and well-being

28) The new strategy has brought "the citizen" more to daylight as a client/group of clients. The activities up to now have shown good level of achievement, although the conceptual range of the Strategic Goal 3 can be broadened. The IEG encourages the FIOH to consider the benefit to small businesses that can be reached through this Strategic Goal and to incorporate all relevant health and safety topics.

29) In order to fully develop and evaluate the impact of this Strategic Goal, the anticipated results should be better defined and performance measures should be developed and used to measure impact.

30) The good progress in website development should be continued, and a strategy should be developed to increase and evaluate its use and usefulness to the users. Short-term value might be assessed by user panels and long-term impact on health and safety of individuals would be a worthy research topic in international implementation research.

Strategic Goal 4: Providing authorities with information for promoting occupational safety and health

31) The IEG commends the FIOH on the development of OHS guidelines. It encourages the FIOH to continue to improve the effectiveness of OHS in collaboration with key organizations and associations of relevance to this area. Due to great demand, regional differences and availability of expertise should be considered in this context. Training provided to OHS should be further updated to focus more on prevention and key priorities in Finnish working life (especially mental health) and to be flexible enough to also address new risks and emerging needs.

Strategic Goal 5: Smoothly flowing work processes, safe and easy to use working methods and tools

32) The IEG is of the opinion that future implementation of the results of the research in this Strategic Goal may benefit from more rigorous evaluation of the developed solutions and their effects both on health and performance outcomes.

33) The IEG would like to complement the FIOH with the implementation efforts so far, in particular with the innovative shift systems. The IEG would like the FIOH to continue and intensify these efforts in that and other areas and does emphasize the importance of the extensive partner network in order to establish maximal effect.

Strategic Goal 6: Solutions for increasing participation in working life

34) The IEG recommends that now it is time to intensify the efforts to disseminate the methods and tools developed. This means that resources should be more focused on dissemination and implementation. However, this should not be done at the cost of

research and development: the methods need to be continuously developed. This could be done in the mutual exchange of ideas between R&D and dissemination and implementation. In spite of that, the non-R&D share of the resources could be increased.

Strategic Goal 7: Controlling new occupational hazards, exploiting new opportunities

35) To continue its successful efforts in reaching this Strategic Goal, the IEG recommends that the FIOH develops a formalized activity, like an observatory function, for anticipating occupational hazards that are not yet known (for example, from climate change).

36) The IEG recommends that the FIOH continues to assure that the findings of programmes in the Strategic Goal *Controlling new occupational hazards, exploiting new opportunities* are integrated with other Strategic Goals.

European and international activities of the Finnish Institute of Occupational Health 2006–2008

37) The IEG commends the FIOH for the scale and scope of its European and international collaborations and strongly recommends the continuation and growth of these efforts.

38) The IEG notes with appreciation the FIOH's contributions to the health and safety of workers in developing nations through its collaborations with the WHO, the ILO and the Finnish Ministry for Foreign Affairs, and strongly recommends the continuation and growth of these efforts.

Client services

39) The FIOH still reaches only a limited number of the potential clients. For the planning of services in the future it might be of value to survey what potential clients are not reached at present. The IEG would suggest a survey of the organizations and corporations that are not presently reached by the FIOH.

40) Some interviewees have noted that their knowledge of competence available in the FIOH is rather haphazard and relates to personal contacts rather than active marketing. The FIOH should consider being more proactive in marketing its competence.

41) There was critique from some interviewees concerning the costs for services; the basis for the pricing was not as transparent as desired. The IEG suggests that the FIOH provides a budget for services sufficiently detailed for customers to be satisfied.

42) Much of the Finnish working population is employed in small and medium-sized companies. Furthermore, service companies increase in significance – the IEG would suggest that the FIOH expands its reports to describe the involvement of small

companies and reports service companies separately. Services to these categories should be reinforced.

43) The Labour Inspectorate is an important partner for the FIOH. The IEG suggests that the FIOH contacts the Labour Inspectorate to discuss the critique from representatives for the authority, concerning delays in commissioned surveys. The IEG suggests that measures are taken to decrease these delays.

44) The FIOH should concentrate its services to areas where new services are developed and areas where the competence of the FIOH is unique. The IEG suggests that the FIOH should consider outsourcing routine services like the operation of aptitude assessment, while retaining R&D, training and quality control.

45) The IEG suggests reinforcing the product line Work Processes and Equipment Development, where the demand is great and expected to increase in the future.

46) There appears to be a shortage of manpower in occupational health even though major efforts have been made in recent years. The IEG suggests that training in occupational health is even further expanded and that marketing of such training is improved.

47) The FIOH produces much written and web-based material. It is unclear if this material achieves the desired effects. The IEG suggests that an end-user survey of the information activities of the FIOH is performed.

Processes, technologies, human resources and finances

48) The FIOH's process management is well-organized. It assures the quality of decisions and a systematic follow-up of the projects. However, it may not be the most rapid way to decide which projects are pursued and which are not. The possibilities to react more rapidly to the demands of the customers at all levels of administration should be considered.

49) The IEG commends the FIOH for the changes made to enhance the efficiency of the laboratory service provision and encourages the FIOH to continue to assess efficiency and be sensitive to client needs across regions.

50) The FIOH has identified the retirement of key staff as a priority and also the need to ensure continuity of activities and knowledge (e.g. in relation to key programmes such as entrepreneurs' health). The IEG encourages the FIOH to continue to address this issue, especially by involving and developing younger staff.

51) The FIOH has taken steps towards staff well-being, among them the introduction of the TYÖTIE programme. The IEG commends the FIOH for the steps taken so far and recommends that the FIOH monitors the effectiveness of the TYÖTIE programme in order to improve personnel's working ability and prevent long-lasting absenteeism due to sickness or other causes. Staff well-being should continue to be given high attention building on the measures already taken.

52) The FIOH Work Climate survey is a useful tool for monitoring staff well-being. Building on recent results from the survey, the IEG recommends that the FIOH puts in place interventions to address work organization issues in order to reduce strain of staff.

53) Also on the basis of the Work Climate survey, the IEG encourages the FIOH to ensure the recognition of good work and encouragement of staff for their efforts as appropriate.

Helsinki Regional Office

54) The Helsinki Regional Office has well-working and highly competent collaborators with holistic touch on problems. One example is the indoor air team with its systemic approach. A strategic question for the FIOH and the Helsinki Regional Office is how to find similar comprehensive approaches in other teams. The IEG suggests that this model is applied to other teams as well.

55) The Helsinki Regional Office has a great demand for measurement and for interpretation of the measurement results. It is important for the Helsinki Regional Office to find a balance between these two functions taking into account customer needs and staff resources.

56) Customer satisfaction is vital for successful work of the Helsinki Regional Office. That is why it is recommended to continue existing feedback and networking methods and to develop new fora for cooperation and information distribution.

57) The Helsinki Regional Office has good know-how and efficiency to wider approach and development which would give good opportunities to think about the work and task sharing between the FIOH headquarters and the Helsinki Regional Office.

Kuopio Regional Office

58) The Kuopio Regional Office should continue to develop strategies to market the FIOH services to small enterprises. This effort should be coordinated with those planning the programmes under the Strategic Goal *The management of occupational health hazards at work as part of management practices and corporate risk management*.

59) The Kuopio Regional Office should continue to enhance the interactions with the regional Advisory Board to support the Strategic Goals of the FIOH and refine the priorities of the Regional Office.

Lappeenranta Regional Office

60) The Advisory Group is very favourable in relation to the ongoing activities of the Lappeenranta Regional Office. This view was supported by the customer impact and societal usefulness analysis. Critical views concentrated on available service resources of the Lappeenranta Regional Office which were considered insufficient to provide needed services. The IEG commends the successful cooperation with the Advisory Group to analyze future needs. It is also important to keep in mind the region's high numbers of traditional safety and health problems. By putting more resources on these the Lappeenranta Regional Office can increase its added value for employees and enterprises.

61) The Director acts as a “main ambassador” for marketing and networking services, activities, training courses and development projects to customers. The Director also supports teams in their activities. According to assessments this has been done very well in the Lappeenranta Regional Office. Besides this, another important issue of the manager is to support and develop multi-professionalism and flexibility of the staff. A recommendation is to consider the strategic choices of the Lappeenranta Regional Office: how to balance services and other activities of the Lappeenranta Regional Office taking into account the customer satisfaction and staff resources as well as the FIOH Strategic Goals.

Oulu Regional Office

62) The IEG commends the Oulu Regional Office on the outstanding research and solutions for cold climates and encourages further development of research and solutions for workers in both cold and hot climates.

63) The IEG encourages the Oulu Regional Office to continue its research, teaching and service with partners on mining and metals.

64) The IEG values the knowledge gained from and encourages continuing the exploitation of the unique Nordic Birth cohort studies.

Tampere Regional Office

65) The Labour Inspection Authority appreciates the training the FIOH provides for inspectors. However, in daily inspection activities, inspectors have often an acute need of service. The FIOH has problems meeting demands of urgency. We therefore recommend that the FIOH and the Labour Inspection Authorities define jointly the legitimate service expectations including waiting periods so that both parties know what the FIOH service promises are.

Turku Regional Office

66) The Turku Regional Office, as other FIOH Offices, is responsible for a large number of small and medium-sized enterprises, also spreading across the archipelago region. The IEG commends the Turku Office for the development and implementation of programmes that address small and medium-sized enterprises and entrepreneurs’ health. It is recommended that resource availability is considered in light of staff retirement in order to address small and medium-sized enterprises needs.

67) The FIOH has already identified the lack of occupational health physicians and nurses in the Turku Regional Office. This has been confirmed by the current evaluation. This has an impact on training of occupational health personnel in the region, and also on the provision of quality occupational health services. This problem may not be restricted to the Turku region and may not be a responsibility of the FIOH. However, the FIOH should consider increasing the activities in training of occupational health physicians.

Base Report

(Final, 6 March 2009)

Table of contents

1 Mission, legislation, organization

The Finnish Institute of Occupational Health (FIOH) is a cross scientific research institute which promotes work safety, occupational health and well-being at work. The institute functions at the administrative sector of the Ministry of Social Affairs and Health. FIOH carries out research, disseminates information, provides expert services, and trains occupational health and safety specialists. The goal of the institute’s activities is healthy workers, a sound work community, and a safe and productive work environment.

FIOH was established in 1945 as an occupational health department at Helsinki Public Hospital. Since 1950, FIOH has been operating as an independent organization. In the beginning, the institute was financed by the Foundation of Occupational Health, and since 1978, it has been functioning at the administrative sector of the Ministry of Social Affairs and Health.

1.1 Legislation

FIOH is an independent, subsidized, public corporation supervised by the Ministry of Social Affairs and Health. For financing the operations, 80% of FIOH's budgeted costs approved by the Ministry of Social Affairs and Health, which are determined according to the extent of the activities approved in the annual State budget, are paid annually as a Central Government transfer. In addition, FIOH is able to pursue activities financed by its own income cumulated as fees for services, training courses, publications and external grant funding for research projects. It is also obligated by law that FIOH provides research and specialist services to companies as well as to individuals. In FIOH's highest administrative organ, the board of directors, all the essential occupational health and safety authorities and labour market organizations are represented.

1.2 Mission

FIOH's mission is to promote work safety and health as a part of good living. Healthy, safe work and good balance between work and other aspects of life create a solid foundation for people’s well-being and encourage participation in work life. As a research and specialist institute, FIOH produces information and solutions to problems. By applying the solutions, clients can learn new things, improve their operations, and thus realise their goals.

The strategic goals related to FIOH's mission include developing methods and services which help assess and prevent health hazards in workplaces, as well as controlling new occupational hazards and exploiting new opportunities. Innovative, regenerative and healthy work communities and solutions for increasing participation in work life by providing authorities with information for promoting occupational safety and health are also valued as strategic targets. In addition, the strategic goals such as smoothly flowing work processes, safe and easy-to-use working methods and tools with each citizen equipped to ensure his or her occupational safety and well-being, guide the operations in FIOH.

All the strategic goals constitute development tasks through which the opportunities, success and well-being of clients are improved. The solutions are developed based on the scientific evidence and incorporated as a part of the clients' operations. The mode of operation can be found in Figure 1.1. The chain of innovations begins with research, continues as development work, and ends with the dissemination of functional solutions into practice. To ensure the effectiveness and efficiency of the solutions, an evaluation research is carried out.

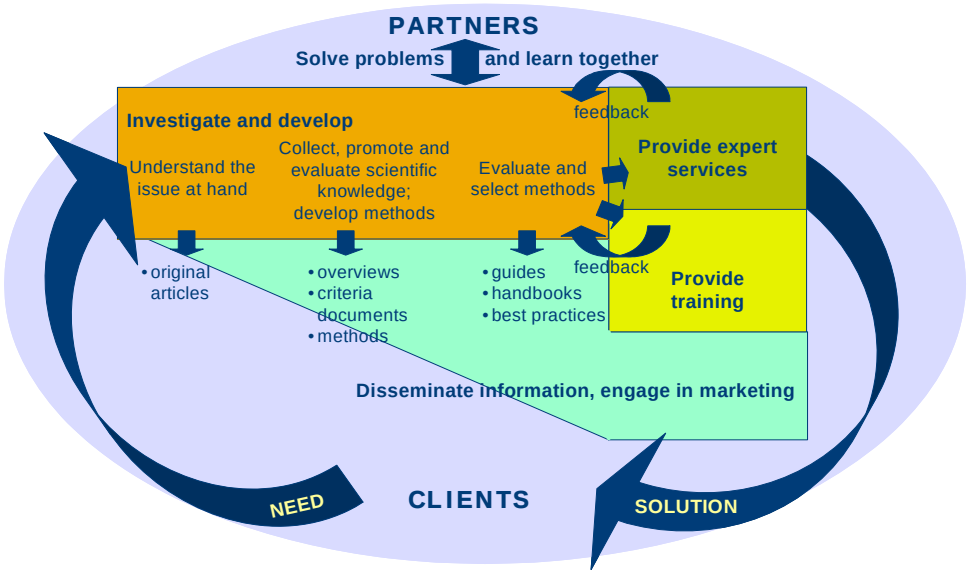


Figure 1.1 The mode of operation.

1.3 The organization structure

In 2006, FIOH was re-organized into six Centres of Expertise in order to achieve the strategic goals. The current organizational structure can be found in Figure 1.2. The six Centres of Expertise include Work Organizations, Human Factors at Work, Work Environment Development, Health and Work Ability, Good Practices and Competence, and Internal Services.

The team structure will enable FIOH to closely focus on essential issues and to consequently improve the impact and efficiency of operations. The Centres of Expertise consist of Thematic Areas, Teams and Units of Excellence. The thematic areas will focus on the main current problems and development opportunities in work life. Their aim is to create social innovations that meet the needs of work life in Finland, and their key tasks are to create a scientific basis for innovations, to plan how to implement them in work life and to provide support for partners distributing the innovations. Currently, the focus is on two thematic areas: good indoor environment and work and life course. The Units of Excellence engage in top-level international research in carefully focused areas for the purpose of generating scientific innovations. At the same time, the units create partnerships, channels and visions in the international scientific community to support the work of FIOH. At the moment, the two units

are the Unit of Excellence for Immunotoxicology and the Unit for Excellence for Psychosocial Factors.

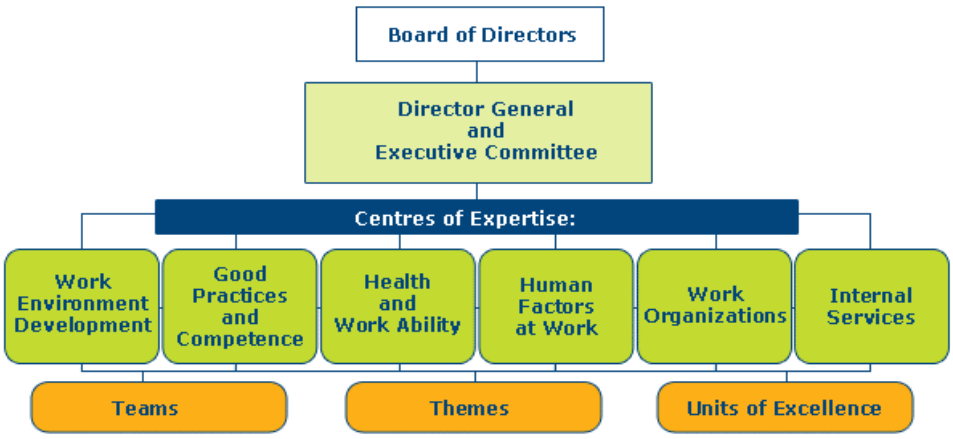


Figure 1.2 The organization structure.

2 Strategy 2006–2010

2.1 FIOH Evaluation in 2004

The International Evaluation Group (IEG) was requested by the Ministry of Social Affairs and Health to conduct a thorough and objective scientific and operational evaluation of the entire Institute and its Departments and Regional Institutes for the period 1997 - 2003. The IEG evaluated FIOH activities in light of the strategic vision of the Ministry of Social Affairs and Health, "Strategies for Social Protection 2010". The following four perspectives made the framework of the evaluation:

– Society and client results ('mission effectiveness')
– Knowledge, competence and work ability
– Operational efficiency and quality
– Resources and financing.

The International Evaluation Group was composed of nine senior experts in the various areas of occupational safety and health from six countries. The Group included

– Dr Marilyn A. Fingerhut, The National Institute for Occupational Safety and Health (NIOSH), USA
– Prof. Frank van Dijk, University of Amsterdam
– Prof. Erik Dybing, Norwegian Institute of Public Health
– Prof. Lars Hagmar, University of Lund
– Prof. Kari Hemminki, German Cancer Research Center (DKFZ), Karolinska Institutet
– Dr Joachim Lambert, Commission for Occupational Health and Safety and Standardization (KAN)
– Dr Thomas Schneider, Danish Institute of Occupational Health
– Prof. Hannu Uusitalo, Finnish Center for Pensions (Eläketurvakeskus)
– Prof. Gunnela Westlander, University of Linköping

The IEG reviewed the self-evaluation reports prepared by FIOH units, and met in February and April 2004 with the leaders of each Department and Regional Institute and with the stakeholders and clients of FIOH. Prior to the work of the independent group of external evaluators in 2004, each Department and Regional Institute produced a self-evaluation report, covering the years 1997–2003. The report was finalised and delivered on June 10, 2004 to the Minister of Health and Social Services, Liisa Hyssälä, and a seminar was held for FIOH staff.

The International Evaluation Group stated that FIOH fully deserves its fine reputation as a world and national leader in occupational health. FIOH was seen as highly successful in implementing its mission to enhance the quality of modern work life and to ensure the safety and health of the Finnish working population. The report of the Evaluation Group included recommendations to build on this ongoing success. There were altogether 83 recommendations: 21 recommendations on FIOH's operations as a whole, and 62 recommendations on the development of departments, regional offices and operations. The Evaluation Group recommended the following to FIOH:

- Develop permanent collaborative programs internally and with external partners in priority research areas, such as mental health, musculoskeletal disorders, and the maintenance of work ability.
- Assess those collaborative efforts with specific measures of success.
- Strengthen FIOH staff expertise in a type of research that evaluates the effectiveness of health and safety interventions (changes) in the workplace.
- Expand the integration of FIOH’s regional offices into the priority areas so that they can help companies to implement successful intervention.
- Promote accessibility to FIOH information on an even broader scale for companies, employees and experts.
- Address internal management issues, such as the need to plan for replacement of key expertise resulting from many staff retirements in coming years, and to assess needs for new expertise.

2.2 New Strategy

The international evaluation was followed by a strategy redefinition process in autumn 2004 and spring 2005. The IEG's recommendations on how to improve the (intervention) effectiveness of FIOH were especially the subject of work during the process:

- Focus on the relevant working life problems
- Develop solutions together with workplaces and other interest groups
- Test and evaluate methods to find out the best available
- Find partners to further distribute the methods and processes
- Develop marketing and client relationship management
- Make the training and web communications more efficient
- Include the regional offices more firmly into FIOH's research cooperation, especially when taking results into practice at workplaces.

These questions were dealt with by interest groups, especially with FIOH's board and organizations represented in the board. The aim was to secure the strategic goals fasten on the clients' needs. As a result, seven strategic goals were defined; table 1 shows how the goals were mapped with client needs.

Table 2.1 Client needs and FIOH's strategic goals.

CLIENT NEED	FIOH'S ANSWER (STRATEGIC GOALS)
Workplaces	
Efficient functioning according to the law Occupational health and safety as success factors	Controlling the health hazards of the workplaces as part of the company risk management An innovative, regenerating, prosperous work community
Citizen	
Possibility to control one's own life Maintain one's own health Learn and develop	Solutions to increase the participation to working life Give ability to the citizen to take care of one's own work health and well-being Solutions to increase the participation to working life
Public authorities	
Managing the globalisation of work Maintaining and developing the competitiveness and citizen well-being The challenge of the ageing and decreasing population	Knowledge for public authorities to efficiently promote work health and safety Solutions to increase the participation to working life
Intermediary organizations, specialists	
Best, efficient practices, expertise, know-how	Make work processes, methods and equipments safer and more usable Solutions to increase the participation to working life
Future	
Anticipation, renewability	Controlling new working life risks, new opportunities in use

The following ideas of Norton and Kaplan in FIOH's strategy was analysed into four perspectives. In the modification, the strategic goals, the aimed societal and client results, are represented by the impact perspective. FIOH's prowess, its capacity to achieve these results, was structured into three other perspectives: Modes of operations, Staff well-being and skills, and Resources and funding (see Figure 2.1.).

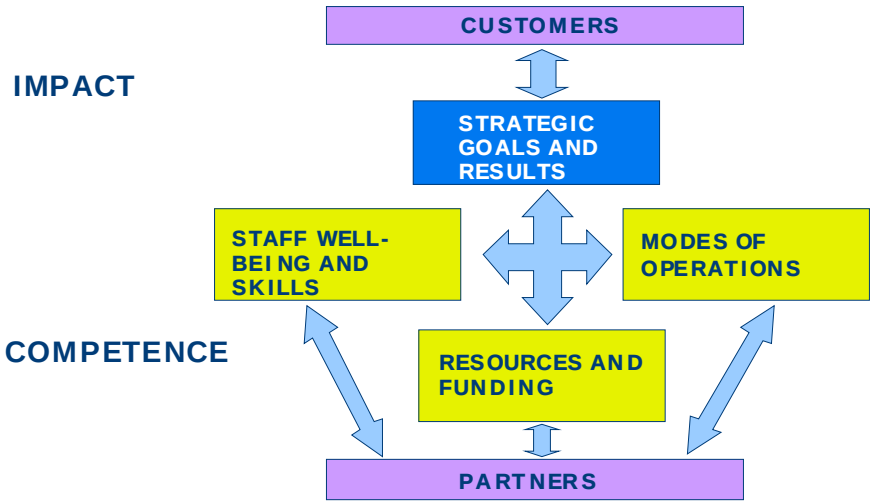


Figure 2.1 FIOH's "Balanced Scorecard".

The Board of Directors approved the strategy on the 1st of June 2005. The strategy is used in the planning of the yearly activities of FIOH.

2.3 Re-organising in 2006

The new strategy 2006–2010, as well as the new organizational structure, has been the largest changes in FIOH since the 1970s expansion. At some level, the changes are still in process. Little by little there will be enough experience of the strategic choices to see which have been successful and which might need re-evaluation.

The previous international, evaluation as well as the discussions during the strategy process, highlighted several problems with the old organization. To name a few: 18 departments and action programs reporting directly to the Director General, which easily leads to inefficiency, fragmented operations and difficulties in leadership, research separated from client oriented activities, and disintegrated productisation and the lack of "market penetration" of the new products.

The strategy renewal was prepared from August 2004 until June 2005. During the pre-project, three alternative organizational structures were discussed i.e. developed version of the current organization, client-oriented branch model, and the Centres of Expertise. The Centres of Expertise was chosen as a model for further development, and a change group as well as a change support group was established. The idea of the Units of Excellence was born during the strategy process in 2004, so the proposals of the new units were already requested from the staff in autumn 2004.

The idea of a "thematic area" was first discussed during the international evaluation in 2004. Since then, it was considered as a structure assuring social relevance, focus, and partnership. During the strategy process, a concept of a social innovation was incorporated. During spring 2005, five themes out of 19 proposals were chosen to be further developed. Later in 2005, an inspection was held in order to present and discuss the theme proposals. Two themes were chosen and core groups working mainly for the themes were formulated.

A Change Management Group was established for the practical processes of the re-organization. It started to work on the idea of the teams. The group organized a two-day team workshop where circa 120 participants were invited. A mission of the workshop was to define teams, their basic tasks and methods, and the new Centres of Expertise given the prerequisites i.e. and team types. The material produced by the workshop was used mostly as the basis of the Change Management Group's further preparations.

The next step was to start recruiting the team leaders and area managers. The recruiting was done as an internal registration. The enrolment procedure included questions on respondents' vision, knowledge, and career development. The Change Group made the recruiting decisions in September 2005. The first task for the newly recruited team leaders was, together with the Steering Committee of the Centres of Expertise, to consider what kind of knowledge the teams need. For the employees, marketplaces for the new teams were arranged in order to inform and introduce the new Centres of Expertise, team leaders, and teams' goals. The employees had an opportunity to register themselves to a team of their own choice. When dealing with the key personnel, the team distribution sometimes required multiple negotiations, but in general the relocations did happen based on the registrations. The last step in the recruiting process was to find the management for the Centres of Expertise. It was also done by internal registration and the recruiting decisions were made by the Board of Directors.

The change communications was highly emphasised during the entire process. From the beginning, it was considered important to inform the employees on the organization change openly and regularly. The most frequently used communication channels were the Director General's briefings, newsletters, and FIOH's personnel magazine, *Työtisläinen*. The first change readiness survey was conducted already in June 2005 when the change process was only at its starting point. At the same time, responses to the new strategic goals among the employees were researched. The results showed the change objectives were quite justified and the targets understandable. The second survey conducted in October 2005 showed that, in general, the attitude towards change had remained the same. At this time, the Centre of Expertise and team structure, as well as the team leaders, had been announced. In the third survey in April 2006, the perceived usefulness of the new organizational structure decreased a bit, although the survey of working atmosphere in the end of 2006 showed that the change readiness had increased radically compared to the previous one in the beginning of 2006.

2.4 New approaches

1. Identity of a public R&D organization

In the strategy process, FIOH wanted to clarify its identity and legitimacy as a public R&D organization. This could not be based solely on the intrinsic logic of R&D. FIOH wanted to distinguish ourselves from the academic research institution. FIOH utilised Prof. Michael Gibbons' discourse on scientific knowledge production. This discourse was introduced to us e.g. by Dr. Antti Hautamäki (Sitra, the Finnish Innovation Fund). Gibbons' "Mode 1" knowledge production is academic and takes place inside the science world, while the "Mode 2" knowledge production is research carried out in the context of the application of the knowledge. The Mode 1 approach is typically discipline-based, while Mode 2 is interdisciplinary. This distinction is not so much between basic research and applied research but in the phrasing of the objectives of research.

The strategy process formulated this discussion in the phrase: "FIOH will create practical solutions, learn and develop together with its clients and partners." The efficacy of FIOH's solutions is based on scientific knowledge, on the solid understanding of phenomena. This leads FIOH to a positioning as a bridge builder and co-developer in the field of clients, political authority and research community. This role is illustrated in Figure 2.2.

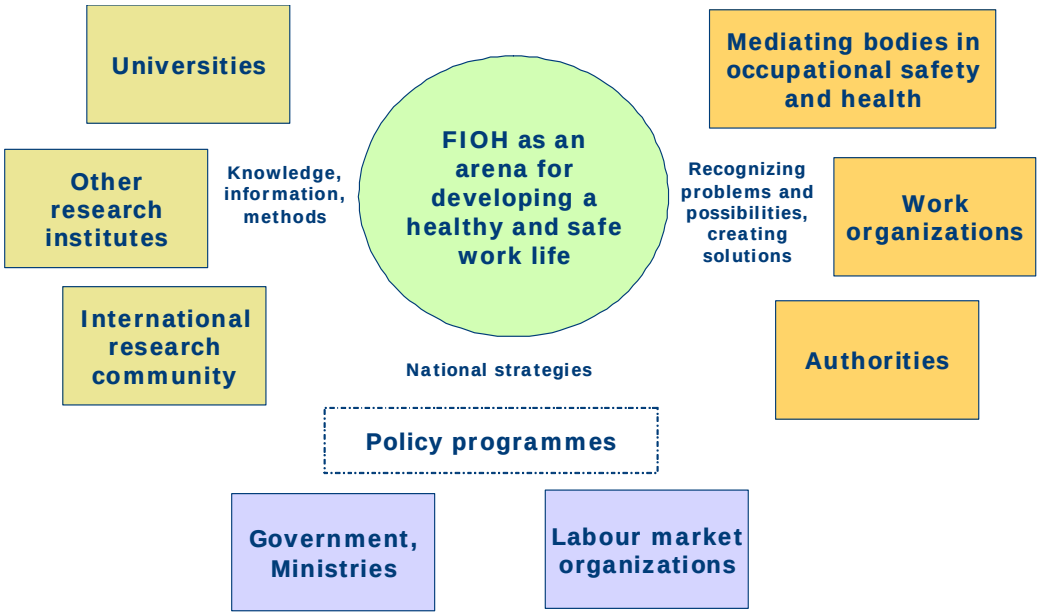


Figure 2.2 FIOH as a co-developer.

2. Innovation as the mode of operation

The mode of operation of FIOH, "Solutions to the need of clients" is described in Chapter 1 Fig. 1.1. It is characterised this mode of operation also as an innovation model.

In this context, the concept "innovation" expresses the importance of the transitions into practice. The results of R&D need to be implemented if FIOH is going to keep its promise to bring out public good and solutions to clients. FIOH has already noticed our strengths as an innovator, and by strategic choices FIOH can further strengthen this potentiality.

FIOH should incorporate into its intervention/prevention approach what is learnt of the innovation processes. FIOH should do evaluation research in order to assure the effectiveness of its activities. FIOH should gain competence of the productisation processes in order to convert the R&D outcomes into service and training products. FIOH should wisely utilise the potentiality of the bridge builder role described above. The functions of R&D, specialist advisory services, training and information in its organization already function well; their interoperability could still be improved though.

3. Making societal and client results

When defining the strategy, FIOH has been looking for ways of effectiveness in producing impacts and then continued to find management and action processes which are capable in the implementation of the strategy. There has been a twofold approach.

The long-span, system-level development has been organized into strategic programs. Here, the goal is to improve our system-level effectiveness. Strategic programs are supposed to bring out societal results by interventions and development work; their aim is to change

modes of operations in general. Altogether, 22 strategic programs were defined in order to execute the seven strategic goals in FIOH's strategy. The strategic programs focus and gather the needed expertise into co-operation which operates over our own organizational units and extends to external partners. They steer the direction of separate projects and other operations to the substance areas and innovation model in the way that there is a balance between the production of research information and transferring the results into practice. There is now two-year experience on the implementation of strategic goals and the leading of them. It seems that the adopted model has focused our operations and is built on a new kind of internal and external co-operation.

The second approach is the producing of client results. FIOH also wants to respond efficiently to the demand of calls on current information and development support by individual clients. FIOH's concept here is "basic operations". Basic operations refer to the offering of service, training and information products and maintaining readiness in statutory obligations. A part of the basic operations is market-based, and a part includes special tasks agreed with the authorities. During the strategy period, FIOH has tried to change from the offering the expertise of individual specialists to to offering products of an entire institution. FIOH has defined seven product lines, products and product families for them. FIOH has also developed the mode of operation on how R&D can be linked to the development of new products or the renewal of old ones. The aim is that FIOH operates professionally and cost-efficiently on the market according to FIOH's mission. FIOH offers leading products, but also covers gaps in the market. There has been a lot of development work in the implementation of the strategy in the basic operations, and it is still on-going.

4. Integrated and networking FIOH

Multidisciplinary and multiprofessional co-operation are tightly connected to the above-mentioned Gibbons' Mode 2 approach. The expertise and operability needed in problem-solving have to be derived from the problem and actors involved. Therefore, organizational borders should not be obstacles for the co-operation. Enabling the horizontal co-operation by management and flexible use of resources has, therefore, been linked to the implementation of the strategy.

Efficient solving of contextual problems also calls for partnerships and co-operation with stakeholders and clients. During the strategy period, FIOH has devoted effort in establishing its co-operation with the universities around Finland at the strategic partnership level. FIOH has increased its activities in corporate communications and in managing social relations. FIOH has been actively working in promoting the co-operation between sector research institutions both at the strategic and project levels.

3 System and Societal Results

Overview

Based on FIOH strategy, seven strategic goals are defined:

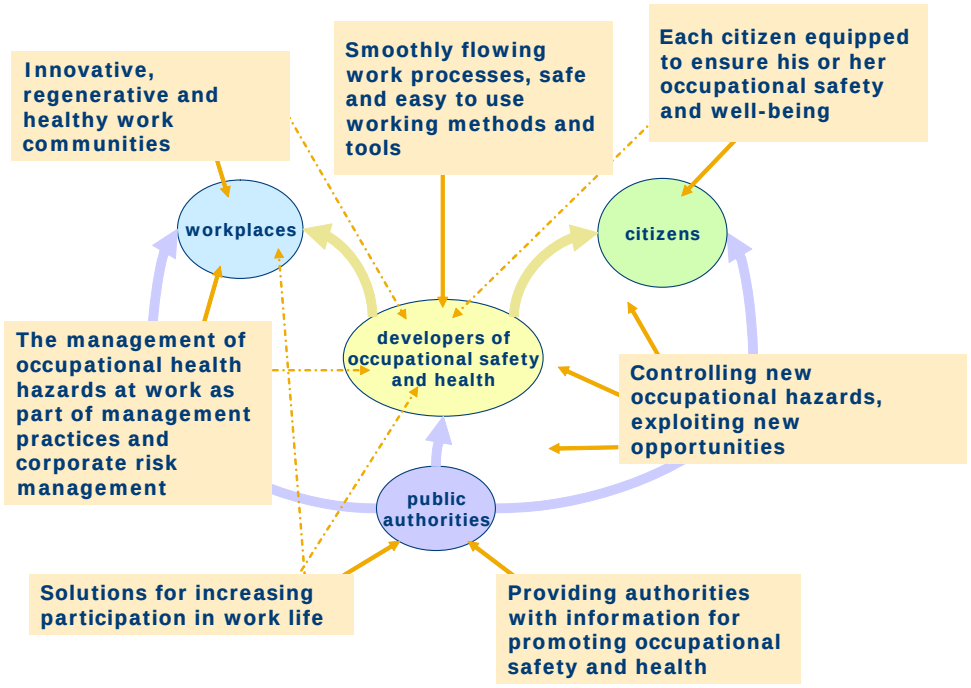
- The management of occupational health hazards at work as part of management practices and corporate risk management

- Innovative, regenerative and healthy work communities
- Each citizen equipped to ensure his or her occupational safety and well-being
- Providing authorities with information for promoting occupational safety and health
- Smoothly flowing work processes, safe and easy to use working methods and tools
- Solutions for increasing participation in work life
- Controlling new occupational hazards, exploiting new opportunities.

The strategic goals were defined after the identification of FIOH's major client groups: workplaces, citizens, public authorities and developers of occupational health and safety. Based on the client needs, each strategic goal was designed into FIOH strategy to fulfil the major client interests on each area. The strategic goals aim at social innovation chains and effectiveness in the improvement of OH&S. The programmes work together with partners and co-operative networks, and they include research, development and innovation, but also dissemination of information, training and even advisory services and consultation based on the needs of each programme.

The Executive Committee of FIOH has intensively followed the 4-year action plan of seven strategic goals and 22 strategic programmes. Each member of the Executive Committee has been personally responsible of one or two of the strategic goals. The annual plans of action, execution and reporting of the strategic goals, and the 22 following programmes, have been the basis of each annual plan of action of the institute. The Centres of Expertise and teams have made their own plans of action based on the resource needs of the strategic goals. Unclarities and conflicts in resources have been discussed and solved in the executive committee.

Figure 3.1: The strategic goals of FIOH.



The use of resources on the strategic goals of FIOH is shown in table 3.1.

Table 3.1 Use of resources on the strategic goals of FIOH.

	Number of participating teams	Person years	
		2007	2008
Strategic goal 1: The management of occupational health hazards at work as part of management practices and corporate risk management		**77**	**69**
1. Occupational safety and health (OSH) management and procedures	8	12	11
2. Accident-free workplace	11	15	14
3. Risk assessment and risk management	10	13	13
4. Promoting the efficient functioning of small enterprises and entrepreuners	9	14	9
5. Detection, control and resolving indoor environment problems	13	23	22
Strategic goal 2: Innovative, regenerative and healthy work communities		**45**	**37**
1. Mastering changes and flexibility at work	7	18	17
2. Innovative and healthy organizations and work communities	8	16	14
3. Promoting gender equality and diversity at work challenges of gender equality planning	9	11	6
Strategic goal 3: Each citizen equipped to ensure his or her occupational safety and well-being		**13**	**12**
1. Citizens' awareness of their occupational health	6	3	4
2. Making the workplace as an arena for the health promotion	13	10	8
Strategic goal 4: Providing authorities with information for promoting occupational safety and health		**45**	**48**
1. Providing authorities up-to-date information on occupational health and safety research	15	3	4
2. Providing authorities with information on trends in occupational safety and health	8	12	10
3. Improvement of effectiveness in occupational health services (OHS)	7	30	34
Strategic goal 5: Smoothly flowing work processes, safe and easy to use working methods and tools		**28**	**25**
1. Promoting human-centred design	12	9	8
2. Human and productive working hours	6	10	10
3. Safe and healthy professional drivers	7	9	7
Strategic goal 6: Solutions for increasing participation in working life		**42**	**34**
1. Ensuring work career in different phases of life	14	18	18
2. Solutions for reduction of sick-leaves and disability	13	24	16
Strategic goal 7: Controlling new occupational hazards, exploiting new opportunities		**47**	**48**
1. Current changes and future trends in Finnish working life	4	7	7
2. Health risks of engineered nanoparticles and nanomaterials	4	12	14
3. Biomedicine in the control of work-related hypersensitivity disorders and musculoskeletal diseases	7	10	11
4. Using knowledge of human neurocognition and physiology in the planning of future information work	7	18	16
Total		**297**	**273**

3.1 The management of occupational health hazards at work as part of management practices and corporate risk management

Overview

Aimed impact

According to current legislation, work must be arranged in such a way that it does not involve the risk of endangering one's health, the risk of aggravating an existing illness, or the risk of work overload. Health hazards at work are also a risk factor for the success of a company, its image, recruitment practices and staff turnover. About 100 000 on-the-job accidents take place in Finland annually. Some 6 000–7 000 cases of occupational diseases are reported annually, but in addition to these, work is also a significant factor in the occurrence of many other illnesses and symptoms, and in disability caused by illnesses. The number of occupational diseases has also increased during last years. About 1 million Finnish workers are exposed to chemicals; new legislation is a challenge, and more than 300 000 indoor workers suffer from poor indoor air quality.

FIOH is developing methods and services that help to assess and prevent health hazards in the workplace, and FIOH develops modes of operations in which controlling health hazards is part of a company’s safety management. FIOH encourages workplaces to set a goal of 'Zero-Accidents'. FIOH enhances the ability of occupational health services and other health care providers to recognise occupational diseases. FIOH creates feedback systems that lead to corrective action when accidents, occupational diseases or sick leaves take an upward turn.

FIOH is developing the operations of occupational health services, entrepreneurial organizations, employment and economic development centres and other support networks, so that small companies and entrepreneurs can better control the health hazards at their workplace. FIOH supports occupational health services and other organizations in the occupational health care sector to develop into comprehensive networks that offer workplaces specialist advisory services in controlling health hazards. FIOH operates as a part of the service network and promote the best practices.

The main indicators are related to occupational diseases (-20 %) and accidents (-40 % until 2015), amount of exposure and new safe behaviour in workplaces.

Main impact process

FIOH offers companies a comprehensive safety management and risk management system, which connects systems in the workplace and includes the tools. Workplaces have a new safety attitude atmosphere where safety is known as a positive competition factor.

Newly developed target levels are in use in key businesses for safety management, and they have been justified by an investing point of view.

FIOH's central role is to innovate the target levels, attitude changes and risk management systems (reasons for slipping, friction materials). In co-operation with researchers, training and communication, FIOH affects to workplaces and to occupational health care by adaptation of new methods and getting changes in workplaces (reasons for slipping, new floors).

The impact comes throughout the years by adopting new methods, e.g. decreasing amount of occupational diseases and accidents (slipping accidents).

Summary statistics

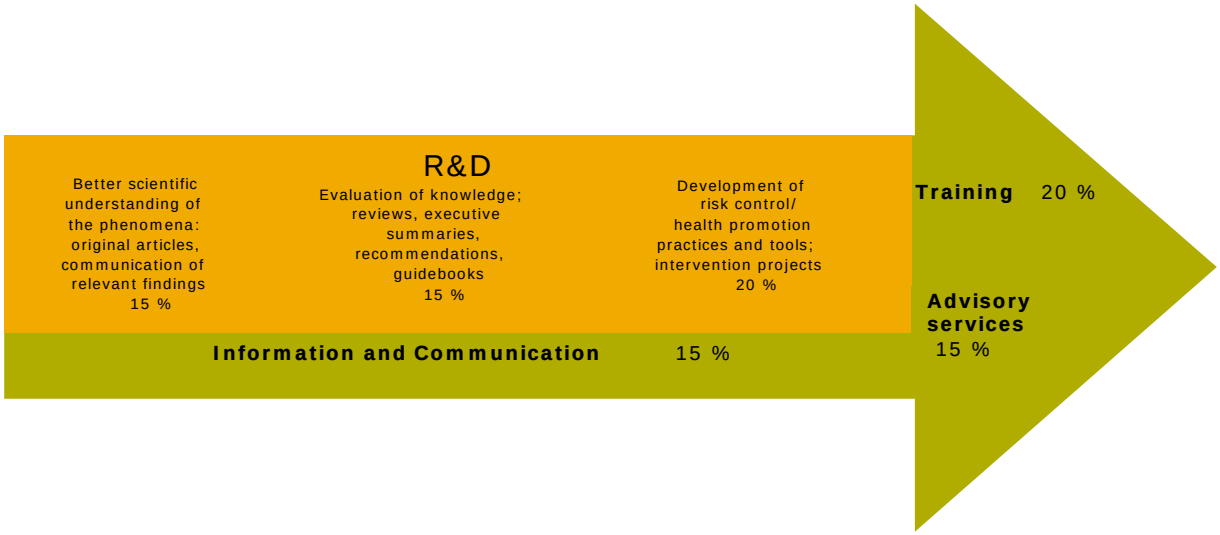


Figure 3.1.1 Allocation (%) of resources according to mode of operation.

Programmes

1. Occupational safety and health (OSH) management and procedures

Aimed impact

The programme strives to promote occupational safety and health management aspects at the workplace so that they are dealt with in accordance to daily activities and decision-making. The programme emphasises direct interaction and collaboration between line management, employees, and occupational safety and health specialists, as well as the society guidance for workplaces, creating long-term, proactive measures, and avoiding OSH complications and hazards in advance.

Aimed impact process

FIOH will study and develop OSH management applications and procedures for both single and shared workplaces in order to effectively implement and integrate OSH into strategic and operative management practices and to meet the demands of clients and society. Development of common OSH management practices and tools shall enhance the positive effects on OSH both at the workplace and at the administrative level.

In risk assessment and work environment consultations or inspections of workplaces, instead of concentrating on single issues or flaws, FIOH and OSH inspectorates will also evaluate the client's OSH and risk management practices. This will put more emphasis on a systematic, positive approach to enhance the clients' OSH management practices, rather than focusing on correcting deviations. Interactive monitoring of workplaces that have successfully implemented a verifiable OSH management system will evidently lead to positive changes in their OSH performance.

FIOH will develop a competency scheme for OSH professionals, specialists and line managers, which will create a structure for national OSH training. FIOH follows up the quantity and quality of training events for OSH management, where FIOH is an organizer or responsible partner. With thorough training, FIOH expects to improve the competence, activity and esteem of individuals responsible for OSH management practices at the workplace.

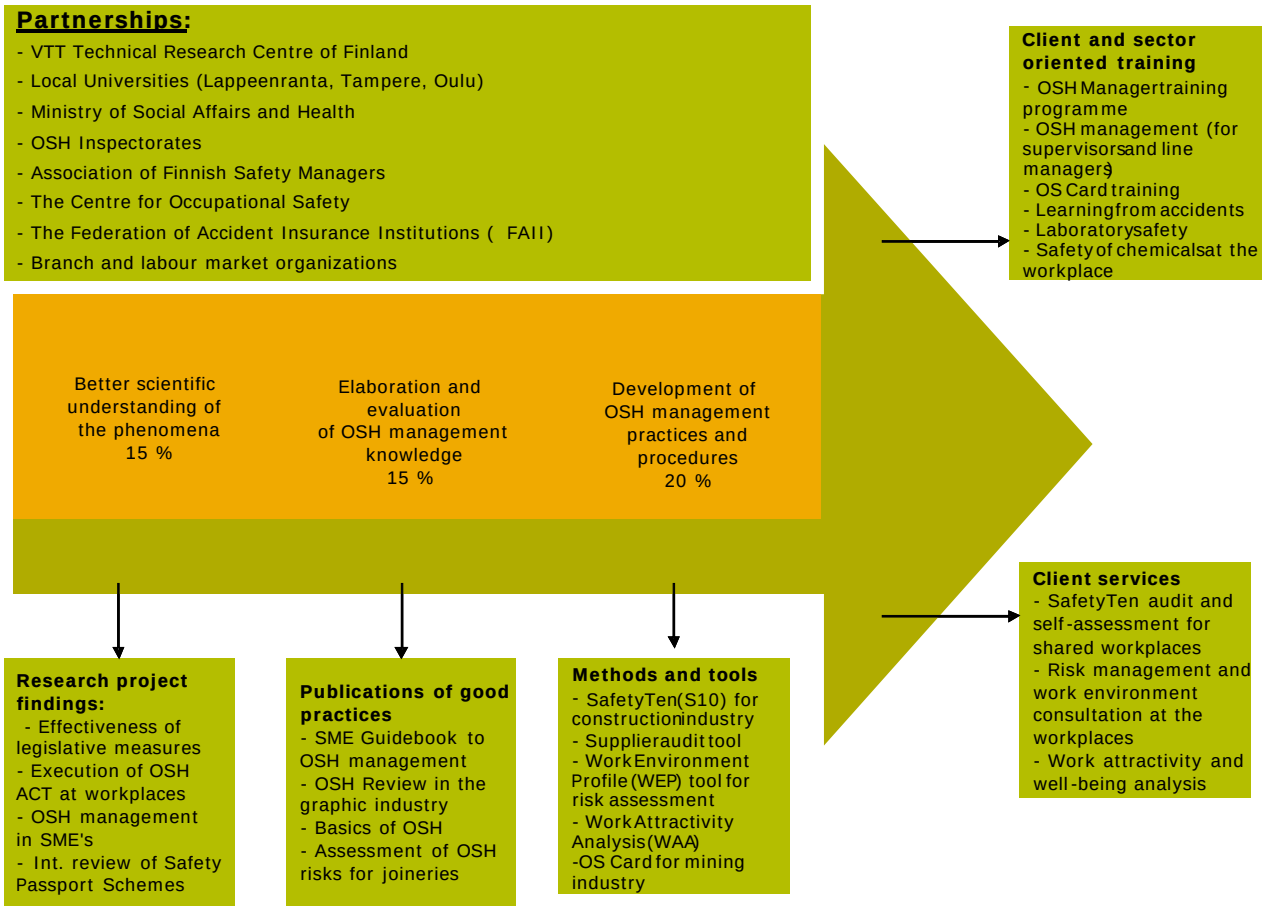


Figure 3.1.2 Allocation (%) of resources and outputs according to mode of operation in SG 1.1.

Focal achievement

Hearing impairment information and developments

Workers with impaired hearing are subject to higher unemployment, earlier retirement, an elevated risk of accident, and a greater risk of mental problems and social isolation. The EU Noise Directive requires a comprehensive evaluation of noisy workplaces to determine the effect on the workers susceptible to the noise, the accident risk caused by the noise, and the combined effect of noise with other agents. The directive also emphasises the use of appropriate hearing protection.

Implementation

FIOH has developed a new step-by-step implementation technique for noise control. The first step is to reduce noise exposure to below the limit by using hearing protectors. The second step expands risk management to include combined exposure and noise susceptibility issues. The final step includes the monitoring of noise exposure and a long-term reduction of noise levels. FIOH intends to use these steps to reduce work-noise-induced hearing losses by 70 %, to reduce the risk of accident caused by noise and to improve the risk assessment of combined effect and individual susceptibility. A properly executed risk assessment has the potential to prevent 2–10 lethal accidents a year.

Before a person with a hearing impairment can obtain the proper hearing aids, there must be an identification of their type of hearing impairment. FIOH is working on these identification problems. In this field, our primary goal is to prevent people in the risk group from moving out of the workforce. It is difficult to predict, but we expect to prolong the work career of these individuals by 3-5 years on average with this work.

Impact

FIOH provides decision makers with information about the impact of nosoacusis and non-occupational noise on hearing impairment. FIOH's activity has had an influence on the state legislative level (resulting in a new act and dissemination of good practices), the European level (at the Bilbao office), and in occupational health and workplaces. In addition, FIOH is planning to create informative material on the subject that is targeted at individuals in 2009. FIOH is working together with labour inspection authorities to create noise and vibration control programs at workplaces and guidelines for the labour inspection authorities to observe during surveillance. By providing information about the risks, FIOH hopes to inspire other actors to work to improve the situation. Theoretically, the size of the risk group can be reduced by as much as 20-40 % with these efforts.

Toppila, E., Pyykkö, I & Pääkkönen, R.: Evaluation of increased accident risk at workplaces. JOSE (2009), in press.

Toppila E, Pyykkö I, Starck J, Johnson A, Juhola M, Methodology and value of databases: in individual hearing conservation programme, in Noise and its effect (312-345), editors, Luxon, L and Prasher D, John Wiley & sons, 2007. London.

2. Accident-free workplace

Aimed impact

The overall aim of this strategic goal is to decrease the number of on-the-job accidents (incl. the number of near-misses) in Finland. This aim is linked to the European Commission's Community strategy on health and safety at work (2007–2012), which aims to reduce the total incidence rate of accidents at work per 100 000 workers in the EU 27 during the strategy period by 25 %.

In working on this safety goal, the following impact aims are set for the end of FIOH strategic period in 2010.

1. In 2010, the activity of the Zero-Accident Forum will cover the working force twice as much as it was in 2006. The activity of the Forum has spread also to the service sector, municipalities and government organizations. Regional networks are active within the Forum.
2. Also, new research results and evaluation methods about human factors in accident prevention will be produced.
3. New materials and products for prevention of slipping accidents will be developed. Better evaluation methods for prevention of slipping accidents will be in use.

Aimed impact process

FIOH is applying the innovation model of FIOH by carrying out research, development, expert services, training, networking and disseminating safety information (see figure 3.1.3). The FIOH staff studies the human factors in accident prevention and develop models for taking into account the human factors in safety. The FIOH staff studies and develops models for preventing the locomotion accidents.

Also, FIOH promotes safety culture at the workplace by introducing the zero-accident concept and good practice in accident prevention. The role of the Zero-Accident Forum is essential here, as it is also linked to the Forum for Well-being at Work maintained by the Ministry of Social Affairs and Health.

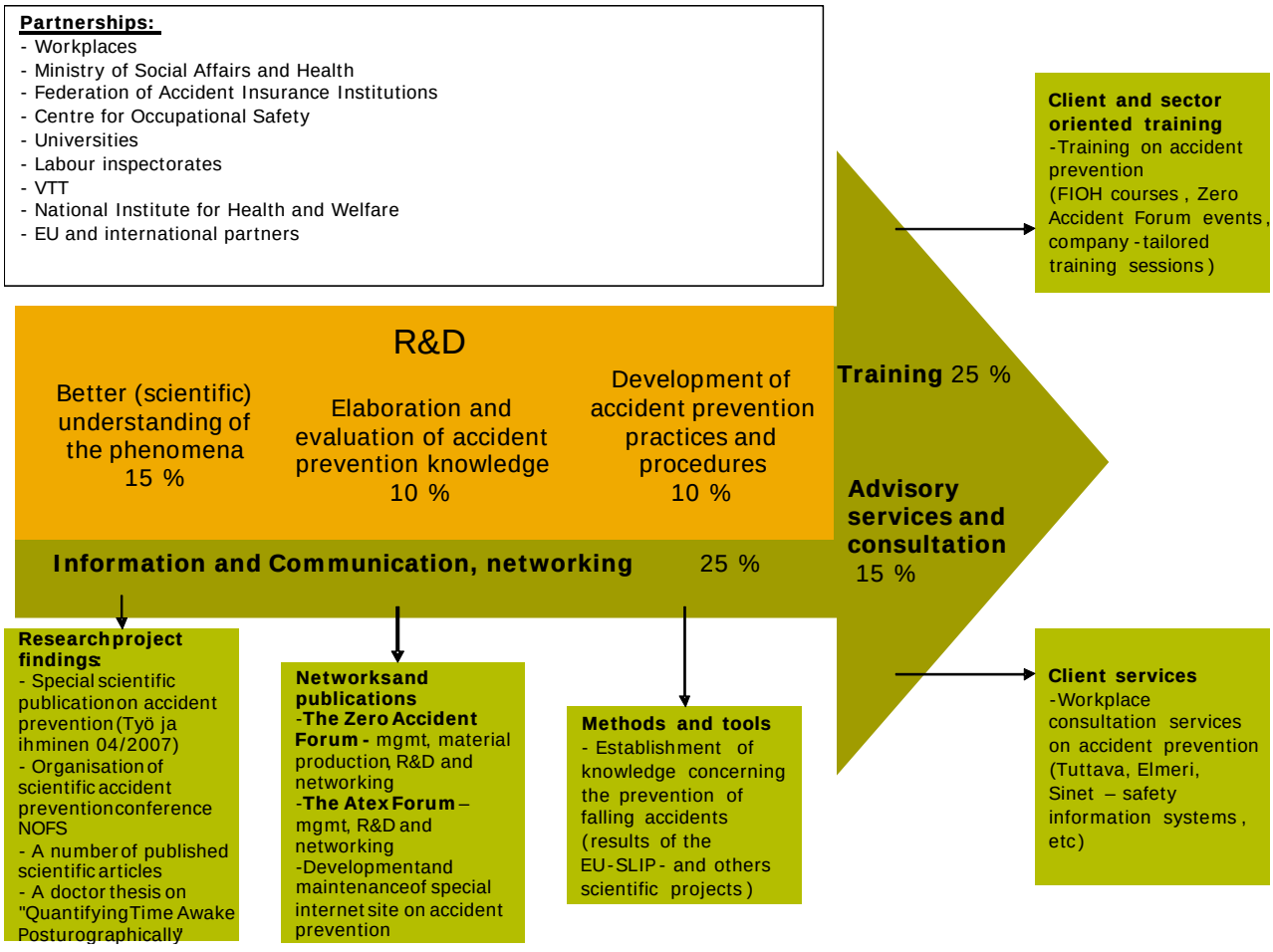


Figure 3.1.3 Allocation (%) of resources and outputs according to mode of operation in SG 1.2.

Focal achievement

The Finnish Zero-Accident Forum

The Zero-accident goal is an ethically sustainable basis for improving occupational safety in working life. Based on the national occupational accident prevention programme, a special Zero-Accident Forum was established by FIOH in 2003. The need for the establishment of this Forum was expressed by some active Finnish companies who wanted to seriously improve their safety level. The Zero-Accident Forum is a group of workplaces committed to sharing their successful practices with others and spreading information that encourages other workplaces to adopt a higher level of safety. Network activities include seminars, recognition schemes, campaign and training materials, extranet services, newsletters, and information services. The concept is a new, innovative way to gather workplaces that share the same safety values together and to learn from each other. The zero-accident concept provides a guiding tool for safety management. The success factors here are the commitment of company top management to safety and involvement of personnel in safety activities. FIOH has played a fundamental role in establishing and developing Forum activities. In doing this, we have utilised our experience from previous accident prevention studies (e.g. VIPA-programme).

Impact

Over 200 organizations representing different areas of Finland had joined the Forum by January 2009, employing more than 250 000 people, which is around 10 % of the Finnish working population. The Forum consists of companies and organizations of various sizes representing several different economic branches (e.g. industry, construction, service sectors, and municipalities). Some of them can boast top-level occupational safety even by world standards, while others require improvement. However, the main principle of the forum is to learn from each other, even across industries and different business sectors. Despite the fact that national accident statistics show that the overall safety level has fallen in Finland in the last five years, the safety level of Forum members has clearly improved.

Aaltonen, M., The Zero Effect Model. The Quality of Working Life: Challenges for the Future. Liber Amicorum for the 10th Anniversary of Prevent. Prevent. Brussels 2007. pp. 166-170.

Web site of the Zero-Accident Forum: www.ttl.fi/zeroaccidentforum

3. Risk Assessment and Risk Management

Aimed impact

Proper and effective risk assessment is still quite a challenge for many small and medium-sized enterprises (SME's). There is a lack of information on risks and good practises on how to effectively assess and control them. The aimed impact of Programme Risk Assessment and Risk Management is to improve the health risk management at Finnish workplaces by creating information on risks and good practises to evaluate and control the risks. The quality

of risk assessments is improved, better management measures are used and exposure levels are decreased.

Aimed impact processes

The *Risk Assessment and Risk Management* programme produces scientific information on health risks attributable to work, risk profiles on different branches/professions and information on exposures and their trends at workplaces. It also produces information on the current shortcomings and challenges in the risk assessment at Finnish workplaces. This will increase FIOH's knowledge on the current situation in Finnish working life and forms the basis for new models, good practises and e.g. legislative actions to control the risks.

Scientific information is used in the production of target levels and limit values (e.g. action limits for biomonitoring) for different occupational exposures. These will give more tools to workplaces to manage potentially hazardous exposures. Target values and biological action limit values will be attached to FIOH analysis reports and published on the internet. Newly generated biological limit values will be also sent to the Finnish Advisory Committee on Occupational Chemical Risk Management to be included in the Ministry of Social Affairs and Health list of indicative limit values for biological exposure indicators.

Control guidance sheets on the best risk management solutions for different work tasks are produced. Management of health risks at workplaces is improved by developing good risk assessment practises, which are distributed to workplaces via FIOH educational services and e.g. the internet. These include control banding -based tools for SME's for the management of chemical risks. Practises taking combined effects and sensitive subgroups into account in risk assessment are also produced.

The EU new chemicals legislation (REACH) aims to improve the management of risks possessed by the chemicals. Producing information and distributing it by the publishing and education programme *Risk Assessment and Risk Management* improves the ability of Finnish industries and workplaces to comply with REACH requirements and use new information, which REACH (and new classification and labelling system, CLP) provide.

The success of the programme is measured as successful distribution of new scientific information and use of it as a basis of e.g. new models/good practises for the control of health risks at workplaces. Implementation of new limit values/target levels, risk management solutions and risk assessment models for use and finally, in the long run, improvements in the management of health risks are the measures of the success of the programme. The partners of the programme are listed in the picture below.

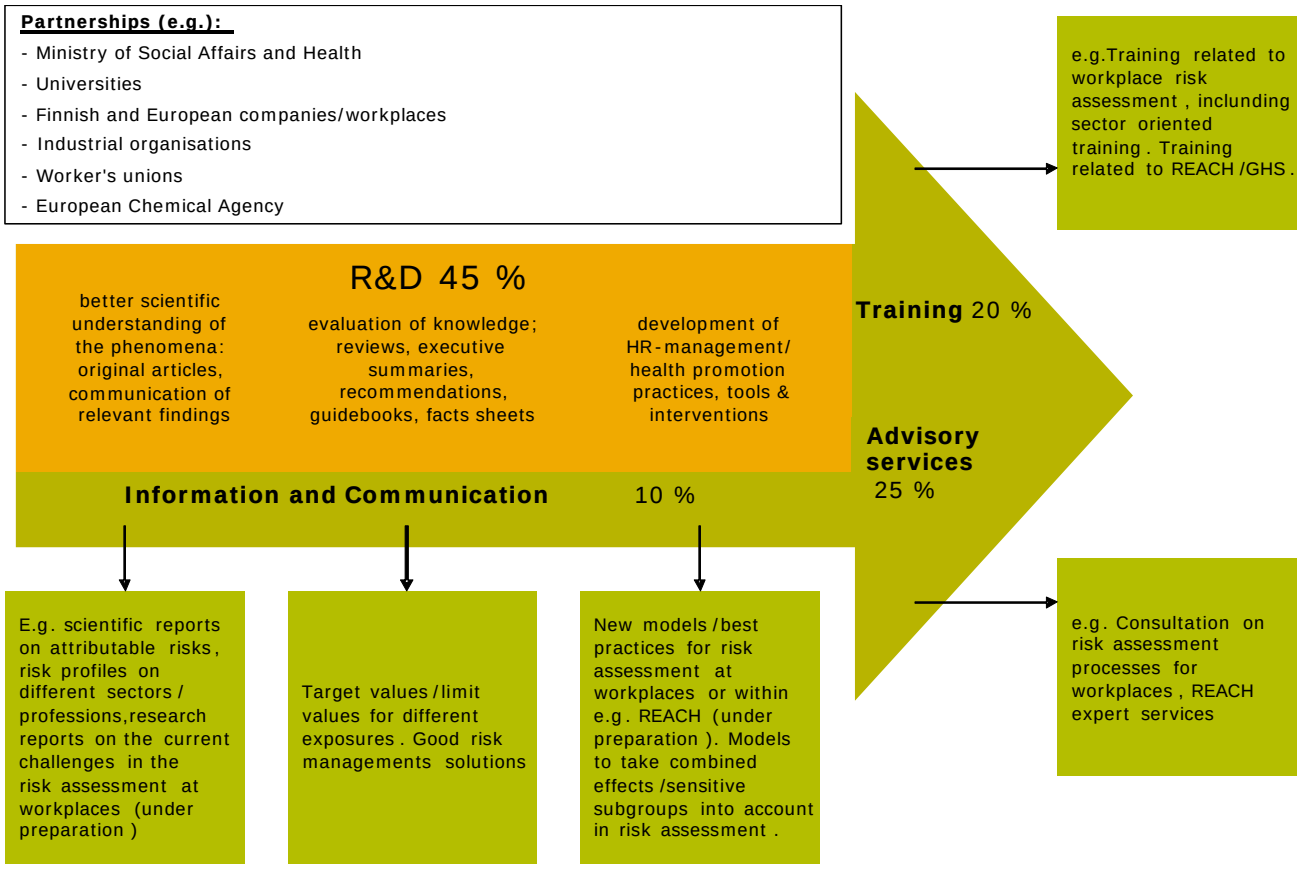


Figure 3.1.4 Allocation (%) of resources and outputs according to mode of operation in programme *Risk Assessment and Risk Management.*

Focal achievement

Development of Risk Assessment of Metals, Metal compounds and Alloys under REACH

The *Risk Assessment and Risk Management programme* develops new practises and services related to the EU's new chemicals legislation, REACH. REACH requires assessment of the risks of all chemical substances and mixtures produced or imported in quantities exceeding 10 tonnes in the European Union. This includes metals, metal compounds and metal alloys. There are, however, no ready-to-use methods to assess the health risks of metal alloys. Since all alloys (thousands of alloys in the market) cannot be tested in toxicological test systems, there is an urgent need to develop new innovative, alternative methods for the assessment of the health risks of these alloys.

Implementation

In 2006, FIOH developed a model for using the so-called read-across approach for the health risk assessment of trivalent chromium compounds. This method can be utilised by the industry in the chemical safety assessment of their chromium (III) compounds under REACH.

In 2007, FIOH initiated R&D projects in collaboration with international metal industry organizations (ICDA and Euroalliages) to develop new models for the health risk assessment of ferroalloys (ferrochromium/ferrosilicochromium and ferrosilicons). In these projects, in vitro data on the dissolution of different components from alloys will be utilised, as well as knowledge on particle surface composition, physicochemical properties and the health hazards of related metallic compounds. In current projects, the approach is extended to alloys to create a new model to assess the health risks of metal alloys.

Impact

These projects aim to increase the scientific understanding of alloy characteristics that may affect the health risks of alloys and thus create a new model for assessing the health risks of alloys. The work is of significant importance for the European metal industry, as it assists it with the assessment of the health risks of smelted metal alloys. Its impact at workplaces will be seen through new guidance values and improved risk management guidance, which can be applied in the metal sector throughout Europe. For FIOH, this work has provided new opportunities to offer international advisory services related to REACH chemical safety assessment.

The new model assessing the health risks of metal alloys will be used in the development of industry guidance (a fact sheet) on the risk assessment of alloys. This fact sheet will contribute to REACH chemical safety assessment guidance. FIOH will act as an independent scientific advisor in the development of this guidance.

Riihimäki V et al (2006) Health Risk Assessment Report for Metallic Chromium and Trivalent Chromium. International Chromium Development Association (ICDA), 2006, Paris, France.

4. Promoting the efficient functioning of small enterprises and entrepreneurs

Aimed impact

The programme focuses on promoting well-being at work, productivity and continuous improvement of work and the working environment of small enterprises (SEs) and entrepreneurs. Small enterprises and entrepreneurs do not utilise tools developed for work environment and safety management. They are not covered by occupational health services (OHS). The present models of action and methods of OHS are not efficient and do not meet the needs of SEs and entrepreneurs. Implementation of scientific approach has been used e.g. in OHS research and management of safety in SEs.

Impact process

A toolkit is prepared for the evaluation of work environment, safety, finance, and management for SEs to evaluate and improve the function of enterprise and its productivity. Clients are mainly the entrepreneurs and the management of SEs.

A three-level model of OHS for small enterprises and entrepreneurs ranging from one time consultative intervention by OHS professionals to a comprehensive, continuous OHS consisting of promotive and preventive services and medical care. The model ensures entrepreneurs and SEs easy access to OHS. It enables them to choose the scope of services that best suit their situation. In OHS, there are specific methods and tools and operational models needed in promoting the occupational health and safety of entrepreneurs and SEs.

SEs, entrepreneurs, and their partners (HR, management, insurance institution, Employment and Economic Development Centre, safety authority, Federation of Finnish Enterprises) are widely involved in a network of regional development and the network is active, they are independent and activities are developed in collaboration with partners.

The effects at enterprise will be utilisation of tools and methods for work environment and management, usage of a network of actors by entrepreneurs and utilisation of the SE-OHS model or tool in OH units.

The future impact of the above inputs: the decrease of occupational accidents and ill-health in SEs, increase in the coverage of OHS by 10 %, improvement of health and well-being in SEs and among entrepreneurs.

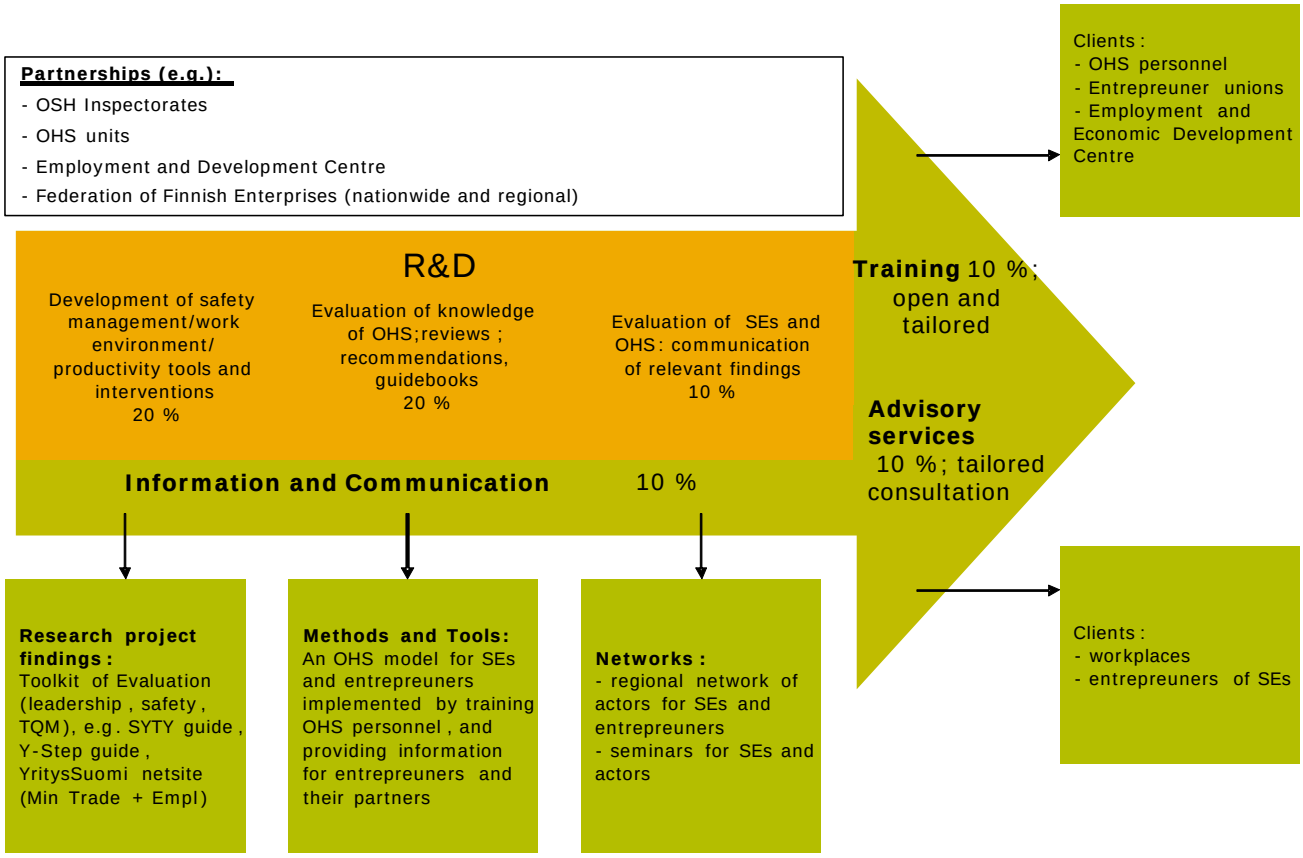


Figure 3.1.5 Allocation (%) of resources and outputs according to mode of operation in programme *Promoting the efficient functioning of small enterprises and entrepreneurs.*

Focal achievement

Network of Professional Competence, 2004–2007

Finnish private nursing service providers want to fulfil the same continuous further education criteria than those in the public sector. That was one major reason to arrange this kind of large development and training project. The project's aim was to increase the professional expertise and support of workers in private nursing homes via increased co-operation between FIOH, other providers of training and business. The overlying objective was to further develop the workplace knowledge network and working life in the North Savo region of Finland. Some 2 200 participants from over 180 organizations participated in the project, which encompassed approximately 13 500 working days and 1 800 separate training meetings.

Implementation

The project made use of the latest research reports from FIOH and other research institutes concerning the social and nursing sectors. The project can be implemented in all areas of Finland and, if needed, can also be used in other Nordic countries. Project activities focused on two areas: the professional skills development of corporate staff by means of education and consultations, and support for occupational health and well-being at work by means of job control.

Impact

There was a clear need for competence development among the personnel of the private nursing homes in question. FIOH organized a network of training institutes and nursing homes and, after the project was successfully executed, several notable impacts could be observed, including:

- Implementation of systematic quality control and total quality management systems in North Savo nursing home enterprises, along with successful certification
- Establishment of Internet-based marketing and information databases for the nursing homes
- Enhanced professional skills of the personnel
- Implementation of professional training and examination for private nursing home businesses
- Creation of networks among the companies participating in the project
- Production of an Internet-based learning environment on Ergonomics (Ergonetti)
- Completion of two Master's theses:
  - Risk control as a part of Total Quality Management in North Savo nursing homes
  - Measuring the economics of North Savo nursing homes

Pitkänen M., Naumanen P., Ojanen K., Louhevaara V.: The Ergonetti - Web-Based Ergonomics Studies: A Qualitative Case Study. The Open Education Journal, 2008, 1, 29-36. 2008 Bentham open.

Ojanen K., Pitkänen M., Louhevaara V.: Työn osaamisverkosto 2001 - 2007. s.105-114. Kirjassa: Naumanen P., Liesivuori J.: Visioita alueellisen hyvinvoinnin ja työterveyden edistämisestä. Työympäristötutkimuksen raporttisarja 28. Työterveyslaitos, Helsinki 2008.

Lehtinen Lauri: Pohjois-Savon yksityisten palvelu- ja hoitokotien riskienhallinta osana toiminnanhallintaa. Kuopion yliopisto, Ympäristötieteiden laitos, 2006.

5. Detection, control and resolving indoor environment problems

Aimed impact

The objective of the programme is to develop social innovation - a new way of controlling indoor environment (IE) in workplaces - which improves the quality of facilities by better planning and building technology, preventing exposure to hazardous impurities from damaged materials, detecting causes of IE-related symptoms and carrying out efficient renovation when needed. The final goal of the programme is that the premises with good IE quality support work processes and their optimal function due to which the workplace can become an innovative and productive environment.

Impact process

The programme encourages workplaces to resolve the IE problems with a multiprofessional and holistic strategy. The skills developed in collaboration with key partners to control and prevent IE problems are improved by training and delivering information. New evaluation methods of IEQ, prediction tools and models of action are introduced to work organizations on how to detect, control and resolve IE problems. New methods and tools will be used in designing healthy and productive facilities. A network of national key actors has now been established consisting of facility designers, building technology and contractor companies, real estate enterprises and the end users of facilities. The network is used as a platform in testing new innovations, methods and tools developed in the present programme. Target and guidance values for good IEQ have developed and already been launched.

The major R&D projects including national training programs are as follows:

- FIOH and Senate Properties (key partner of FIOH IE Theme) launched a development project in order to assess how health and safety aspects could be more effectively integrated into real estate management. Senate Properties is a government-owned enterprise responsible for managing and letting the property assets of the Finnish state. It is the largest property asset manager in Finland with over 13 000 buildings occupied by hundreds of thousands employees. Common practices of the company have now been analysed and a new, successful practice has now been developed in managing and preventing IE problems in the company.
- Before a national refurbishment program of hospitals, and in order to better understand the needs of future hospitals, FIOH launched a nationwide development program of hospital facilities. This was carried out in collaboration with the Helsinki University of Technology (TKK), the Technical Research Centre of Finland (VTT) and KTI Property Information Ltd. Overall, 7 central hospital districts and the Helsinki municipal health care organization, along with 10 companies representing the building industry, facility design, technology and management participated in the project. New models of renovation were developed and implemented in central hospital districts which will lead to safer renovation practices in hospitals.
- MAKSI (Modelled and perceived indoor environment in (open-plan) offices) is a large national research project operating between 2006 and 2009. The project aimed for the improvement of products, regulations, design methods and knowledge about the effects of indoor environment (IE) used for the control of IE. The main focus was on the room acoustic design methods of open plan offices, effects of office noise on work performance and acoustic comfort, and understanding of the operation of cooling in office spaces

during different times of the year. Guidance values and a new internet-based assessment tool were developed for planning the acoustic environment in open offices.

- Multiprofessional and holistic approaches were used to control and resolve IE problems in the metropolitan area (with 3 municipalities) of Helsinki and the city of Kuopio. Models of action in IEQ problems have been analysed and a new model will now be launched to improve the capability in resolving IE problems.

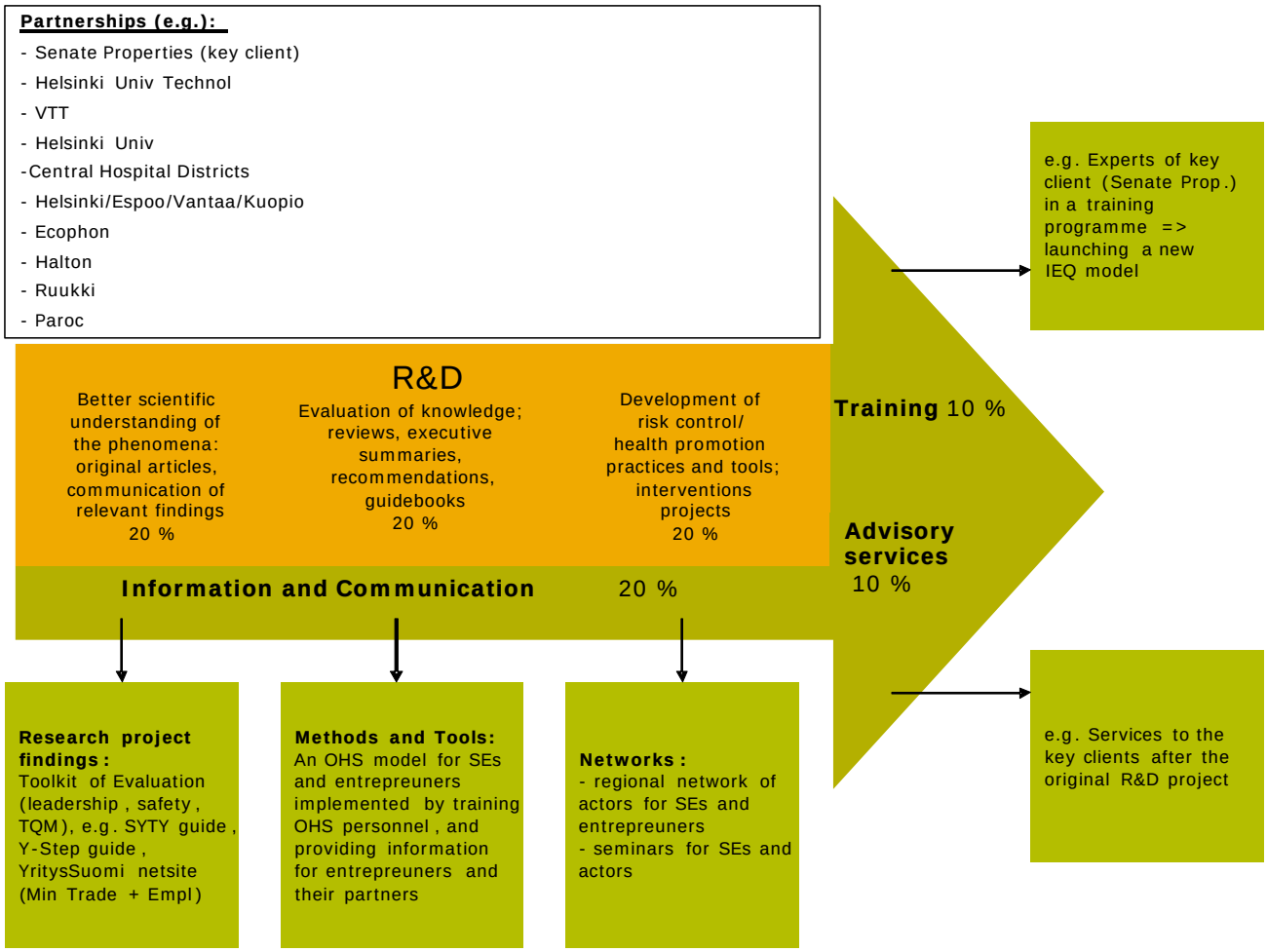


Figure 3.1.6 Allocation (%) of resources and outputs according to mode of operation in programme *Detection, control and resolving indoor environment problems.*

Focal achievement

Modelled and perceived indoor environment (MAKSI) in open-plan offices

The MAKSI Project was founded with the objective of improving acoustic products for office rooms, limiting office noise and developing office design methods. An important focus of the MAKSI Project was the effect of office noise on work performance. The project was jointly funded by TEKES, 11 companies such as building design and technology companies, contractors and the end users, and FIOH.

Implementation

The project emerged from a significant amount of noise complaints received from workers in open-plan office environments. Questionnaire surveys and acoustic measurements by FIOH have recently shown that there is a lack of speech privacy in such offices. Consultant companies have not been able to solve the challenges in this area on their own, due to the absence of a holistic understanding of the relation between office noise and work performance, including its psychological aspects.

The solutions arrived at by the MAKSI Project were based on experimental work, both in laboratory conditions and offices. The project was multidisciplinary, including environmental psychology, cognitive psychology, room acoustics, physics and building engineering. Three laboratory experiments showed consistent evidence that highly intelligible speech reduces the performance of cognitively demanding work by 10%. When speech is made less intelligible by better room acoustic design, performance was the same as in private office rooms. Field measurements of room acoustics in more than 30 offices showed that there are significant inter-office differences in speech intelligibility: speakers can be heard in some offices from 20 metres away, while others require the speaker to be within five metres before speech is intelligible. MAKSI developed a new measurement method linked with speech intelligibility, whereby acoustic measurement results directly predict a decrease in work performance. This kind of practical combination of room acoustics and work performance has never been published before.

Impact

The project aimed at the highest possible national impact and implementation of its acoustics design guidelines in open-plan offices. One such result is the acoustic design tool, which is currently available free-of-charge on the Internet. The new measurement method developed in the project is set to become a new ISO 3382-3 standard, a sure indicator of the eventual global success of this new approach. Room acoustic guidelines were developed accordingly and published as part of the newest IE guidelines in Finland (see SFS 5907:2004, Indoor Air Classification 2008).

RIL 243-3-2008 Rakennusten akustinen suunnittelu. Toimistot. Suomen Rakennusinsinöörien Liitto RIL r.y., 96 s, Helsinki, 2008. (Authors: Hongisto V, Kylliäinen M)

Virjonen P, Keränen J, Hongisto V, Determination of acoustical conditions in open plan offices - Proposal for a new measurement method, revised manuscript submitted for publication, accepted for publication, *acta acustica united with acustica*, Dec-23-2008.

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: ++

- Programmes are based on the application of scientific knowledge gained on own research work but also utilising results from other institutions (background mostly on development models). FIOH should improve the expression of the scientific work behind activities.

Efficiency of implementation process/methods applied: ++

- A goal will be achieved by developing a network of key-partners: real-estate companies and municipalities owning public premises and major operators: building technology companies, which are functioning very well.
- The aim is to achieve a change in workplaces and in their commitment to the continuous improvement in environment quality, which has already partly succeeded. The aim of the programme is clear, but methods should be developed more exactly.

Use of partnerships and cooperation in improving effectiveness: ++

- Partnership networks have been efficiently launched in some programmes and social innovations have been made. Partners are committed to the co-operation and joint goals of the programmes.

Potential impact of produced outputs: +++

- The potential impact of the magnitude of the problem encountered and how it can be most effectively solved and implemented. Utilising the best distribution channels planned fpr gradually leads to potential impact.

Achieved impact: ++

- Two programmes have already achieved impact on the national level, while the rest are in progress and forthcoming. Aimed impact is clear and will be achieved.

3.2 Innovative, regenerative and healthy work communities

Overview

Aimed impact

A meaningful job, well-organized work, well-functioning work communities, and the development of occupational skills form the foundation of regenerative, cooperative and innovative personnel. In these conditions, employees enjoy their work and cope well with its demands. Such organizations are successful in a changing and increasingly more globalised work environment.

In the municipal sector, Finland has recently started comprehensive structural and functional changes, which focus on several hundreds of thousands of employees. The municipal organizations and their service structure and division of labour are changing. All municipal health care and social welfare services and organizations are reorganized. Cooperation between private and public sectors form new kinds of network organizations. New public management has evolved.

Main impact processes

Based on its own research, FIOH develops tools for change management and work organization models that promote well-being, lifelong learning and the efficiency of operations to be used at workplaces, in occupational health services and other organizations developing working life. FIOH develops methods for fostering a workplace culture that converts the diversity of people into a resource, regardless of whether the differences arise from age, gender, occupation, cultural background or personality. FIOH provides information about the effects that new organizational structures and ICT systems (e.g. work that is not dependent of time and location) have on the work community and efficiency of their operations. FIOH also assesses the effects of various management systems on the well-being of personnel and productivity.

The indicators of well-being and improvement at work are available from the results of periodical Work and Health surveys carried out each fourth year by FIOH. The main indicators for this strategic area are measures of quality of working life and the well-being of employees:

- opportunities for developing one’s own professional skills at work
- fair treatment of employees
- work climate encouraging and supporting new ideas
- equal treatment of women and men
- work/life balance
- equal treatment of immigrant workers
- carrying out work climate surveys and organizational development projects at the workplace level.

FIOH follows the psychosocial work environment at Finnish workplaces and develops methods to improve the work organizations and mastery of change processes. Together with social partners, FIOH carries out organizational change management interventions. FIOH offers organizational development and recruitments services to Finnish workplaces. FIOH's main effort is to develop and introduce valid methods based on its own research findings for OHS and OD personnel as well as to workplaces to improve work organizations.

The system effects of FIOH's actions are realised mainly via intermediating actors like OHS and HR professionals. System effects are also possible via contributing to the national PARAS programme and the KASTE programme by the Ministry of Social Welfare and Health as well as the Ministry of Employment and the Economy.

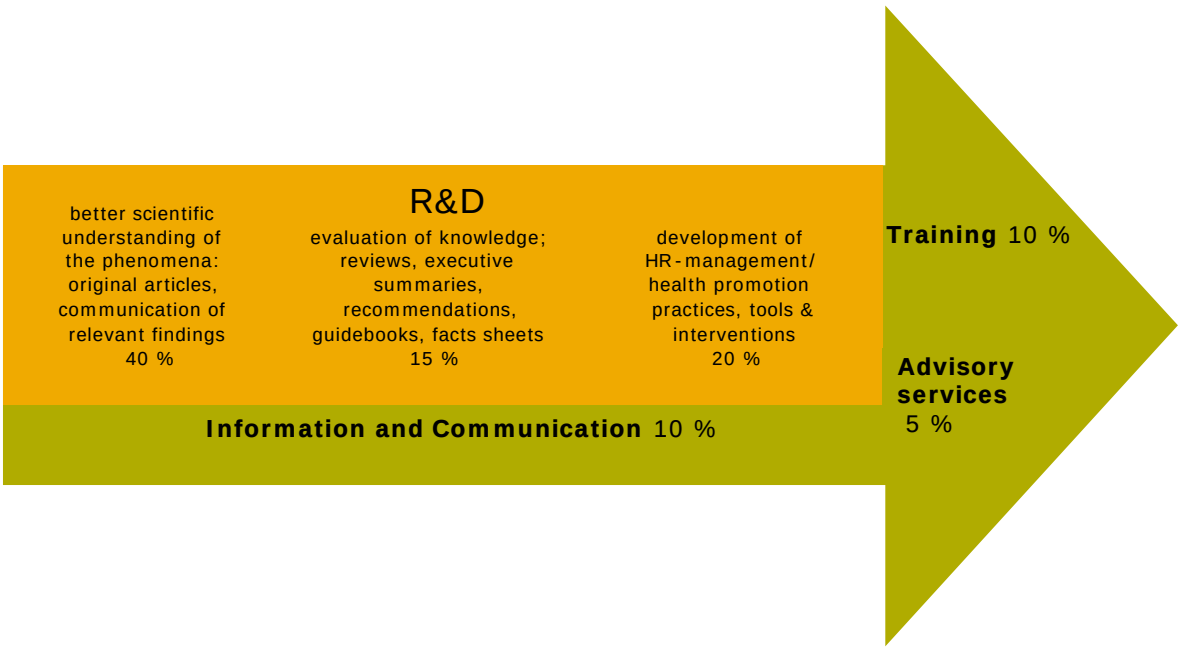


Figure 3.2.1 Allocation (%) of resources according to mode of operation.

Programmes

1. Mastering changes and flexibility at work

Aimed impact

The general aim is to support workplaces in the planning, implementation and evaluation of changes in work organizations and work processes. Understanding the developmental logic of work activity is critical as work organizations are challenged to constantly create new, more functional and cost-efficient production service concepts. Research and development in FIOH covers the whole innovation chain from research to practical tools for change management.

Encompassing structural changes has taken place throughout the entire public sector in Finland. Based on the New Public Management (NPM) doctrine, the purchaser-provider model is increasingly implemented in the municipal sector in Finland. Key success factors in this change are improved change management, mastery of new working culture, and support for the well-being and learning in municipal organizations.

Different numerical and functional flexible strategies regarding e.g. working time, work contracts, and telework have been adopted, especially in the private service sector. New research data is needed in order to eliminate the possibility of a negative impact of these changes on work processes, productivity, and well-being at work. The aim is to develop tools and good practices to implement more flexible strategies at work.

Aimed impact process

The Change Workshop is a participatory developmental method where the participants are guided to investigate the complex and often contradictory elements of their work and its development. In analysing changes in the municipal sector, a large network of research institutions, municipal organizations and stakeholders is formed for expert support in

collection of data, evaluation of the relevance and quality of the study findings, and for disseminating good practice in change management.

In order to be successful, activities and cooperation will be carried out both on organizational, stakeholder (e.g. labour market organizations), and national levels. FIOH has given support to the national KASTE-program ("National Development Plan for Social and Health Care Services, KASTE 2008-2011") by participating in work groups of the Ministry of Social Affairs and Health. FIOH's expert consultation is given to regional health and safety administration in planning, implementing and evaluation research and development activities.

The methodological development of Change Workshop Method still continues by creating new applications to better meet the specific needs of different fields and sectors as well as the local needs of different organizations. As part of the methodological development in different work organizations practitioners have been trained to implement and apply the Change Workshop method in developing work and work related well-being.

In order to improve working conditions in mobile work, FIOH has participated in the EU-Progress Project on the impact of increasing usage of portable computing and communication devices on occupational safety and health in Europe. In addition, FIOH has been co-writer of E-FACTS 33, Risk assessment for Teleworkers, published in http://osha.europa.eu.

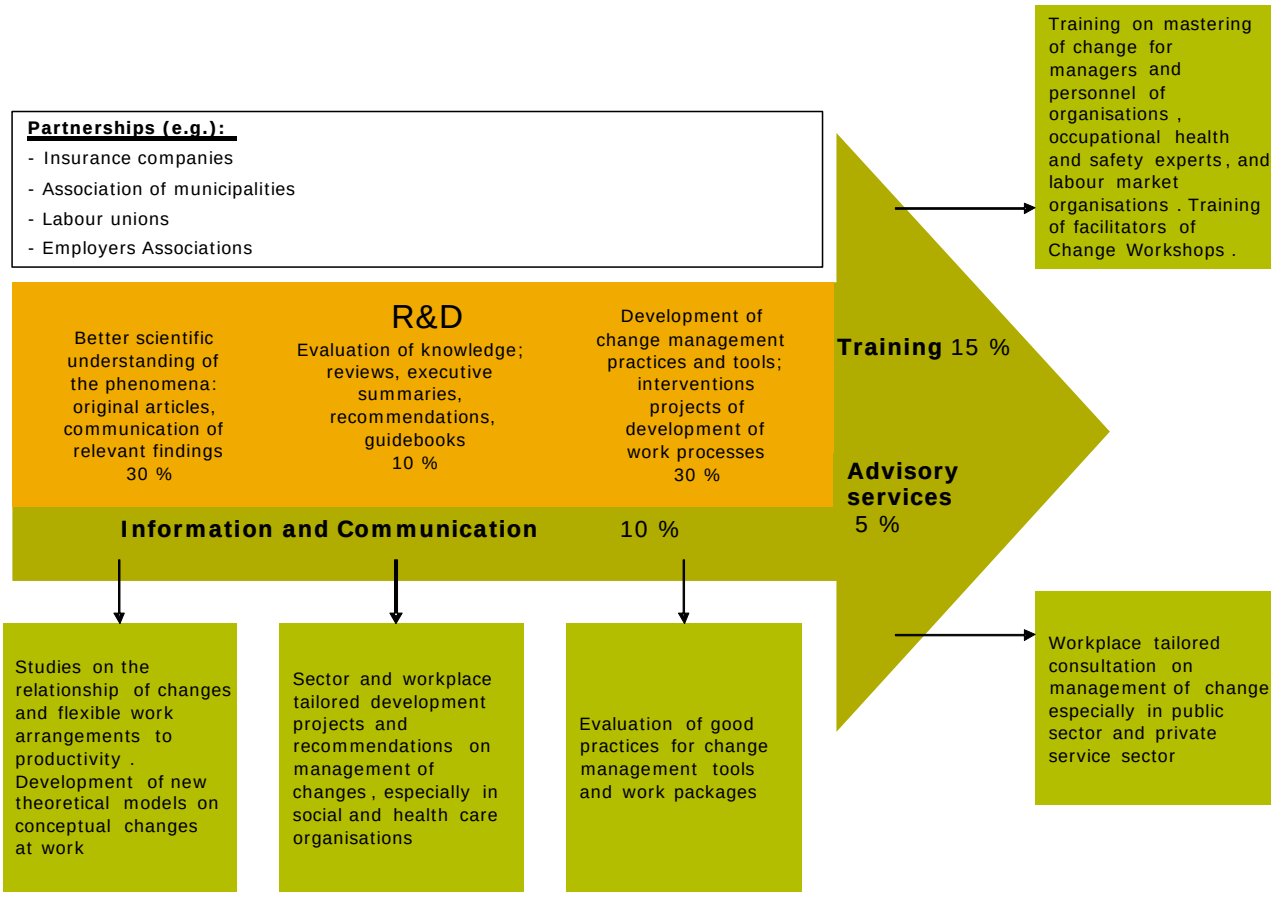


Figure 3.2.2 Allocation (%) of resources and outputs according to mode of operation.

Focal achievements

Support for municipal change management

Based on the New Public Management (NPM) doctrine, the purchaser-provider model is increasingly implemented in the municipal sector in Finland. Key success factors in this transition are improved change management, mastery of the new working culture and support for well-being and learning in municipal organizations. Simultaneously, encompassing structural changes will be carried out throughout the entire public sector in Finland.

A study of the different versions of the purchaser-provider model is going on in five municipalities throughout the country (Oulu, Päijät-Häme, Raisio, Rovaniemi, and Tampere). The main focus is on the management of change and the role of supervisors in change. Data is collected by interviews, documents, and surveys based on FIOH's Kunta 10 study.

A large network of research institutions, municipal organizations and stakeholders has been formed to provide expert support in the collection of data, evaluation of the study findings, and for disseminating good practices in change management. Special emphasis is laid on the social and health care sectors. FIOH supports the national KASTE programme by participating in work groups of the Ministry of Social Affairs and Health, and providing expert consultation to regional health and safety administrations in their planning, implementation and evaluation of research and development activities. Scientific cooperation and co-publishing will be conducted together with the universities.

Huuhtanen P, Olkkonen M-E. Implementation of Change in a Governmental Organization. Book of Abstracts: The XIIIth European Congress of Work and Organizational Psychology. May 9-12, 2007, Stockholm, Sweden. 2007.

Huuhtanen P, Punnonen O. Kunnantalolta kilpakentille. Oulun ydinkunta-palvelukuntamallin synty. Työterveyslaitos, Helsinki. 2008. (in English: Huuhtanen P, Punnonen O. From City Hall to Open Market. The Rise of Purchaser-Provider Model in City of Oulu. FIOH 2008.)

Lindström K, Joensuu M. Competence development and well-being of hospital nursing personnel during organizational restructuring. In Richter P, Peiró JM & Schaufeli W, eds. Psychosocial Resources in Health Care Systems. Organizational Psychology and Health Care. Vol 5. 2007. pp. 171-9.

Methodology to develop sustainable production and service concepts

In order to be competitive, organizations are constantly striving for more functional and cost-efficient product and service concepts. FIOH's results provide evidence that changes in production and service concepts are becoming the major object of research on work-related well-being. Researchers must analyse and conceptualise problems not only from the point of view of single well-being problems, but in the context of the transformation of the production and service concepts. Re-conceptualising change is of the utmost importance when developing methodology to promote well-being at work. Methodology based on a theoretical approach has been developed in projects with several Finnish work organizations going through change. The *Change Workshop Method* has been developed by combining theoretical, methodological and practical elements, and considering evaluations of earlier implementations. The Change Workshop Method was used in

2007-2008 with several client organizations and a report was drawn up for the organizations involved (in Finnish). Individual phases of the workshop methodology have been developed as methods of their own to give a better understanding of the concept changes.

Launis & Pihlaja. Changes in production concepts emphasize problems in work-related well-being, Safety Science 45 (2007) 603-619.

Launis & Pihlaja, Asynchronies and disturbances as a tool in analysing well-being problems at work. Active-Revue electronique 2007;4(2):99-106-

Raas-Huuhtanen S., Launis K., Martimo K-P. (2007) Analysis of a participatory method for developing work in relation to well-being among sawmill employees - a longitudinal study. Proceeding: Researching work and learning, 5th International Conference, Cape Town South Africa, pp. 92-102.

2. Innovative and healthy organizations and work communities

Aimed impact

Innovations in production and services have been regarded as a prerequisite of a successful future for the Finnish society. Innovations, well-being, expertise, and efficiency at work have been topics of books, articles and conferences during the past ten years, but empirical studies of methods to enhance innovations, well-being, expertise and efficiency at work, and to evaluate their consequences are few. As a consequence, the means to improve the ways of acting in the organizations and to evaluate the outcomes of various improvements have been few. Therefore, the following actions were taken.

Although the knowledge base of the factors that influence innovations and the innovativeness of employees, teams, and organizations have increased, most studies have focused on isolated factors. Therefore, four comprehensive reviews on the topic were conducted, and the mechanisms that support the emergence of innovative practises were studied in 8 organizations on health care sector.

Knowledge of the positive indicators of occupational well-being, and the good practices in improving well-being are needed to better understand the relations of work and well-being. FIOH participated e.g. in the validation of the Utrecht Work Engagement Scale and constructed methods to study good practices in supporting job knowledge, work and well-being in different professions.

The need to intervene in work and in the organization to promote employee well-being and expertise has been emphasised. Only a few such interventions studies have been published. FIOH published two reviews on the means to promote worker well-being at work. FIOH also conducted intervention studies on the impact of participative approaches on work, psychosocial work factors, job knowledge, and worker well-being. Neither do evaluated workplace level interventions exist on the area of bullying. Inappropriate behaviour and bullying were addressed in an intervention conducted among the personnel of eight elementary schools. A new popular booklet on the topic was published in 2008. FIOH also contributed in the construction of a factsheet on the best practice in workplace violence and bullying interventions and a guide on the topic by WHO.

Several means of information transmission and training have been used to distribute the information of and the methods created in the studies into organizations, their personnel and other interest groups.

Aimed impact process

Actions are required in all phases of the R&D process to achieve the aims. The methods developed or used in the intervention studies will be used in the other organizations in the direction of an internal or other consultant (e.g. representative on HR or line organization). For example, in the beginning the new consultancy product "Towards highly engaged employees in well-organized work", will be led by the organization consultants of FIOH, but later the rights to conduct these interventions will be transferred to a collaborating organization.

Several means of information transmission will be used to distribute the information of and the methods created in the studies into organizations, their personnel and other interest groups. Training, consultations, and interventions on the topics studied are also required frequently. FIOH organizes international courses on these topics and writes popular booklets and articles to help internal actors at the workplaces to deal with these issues.

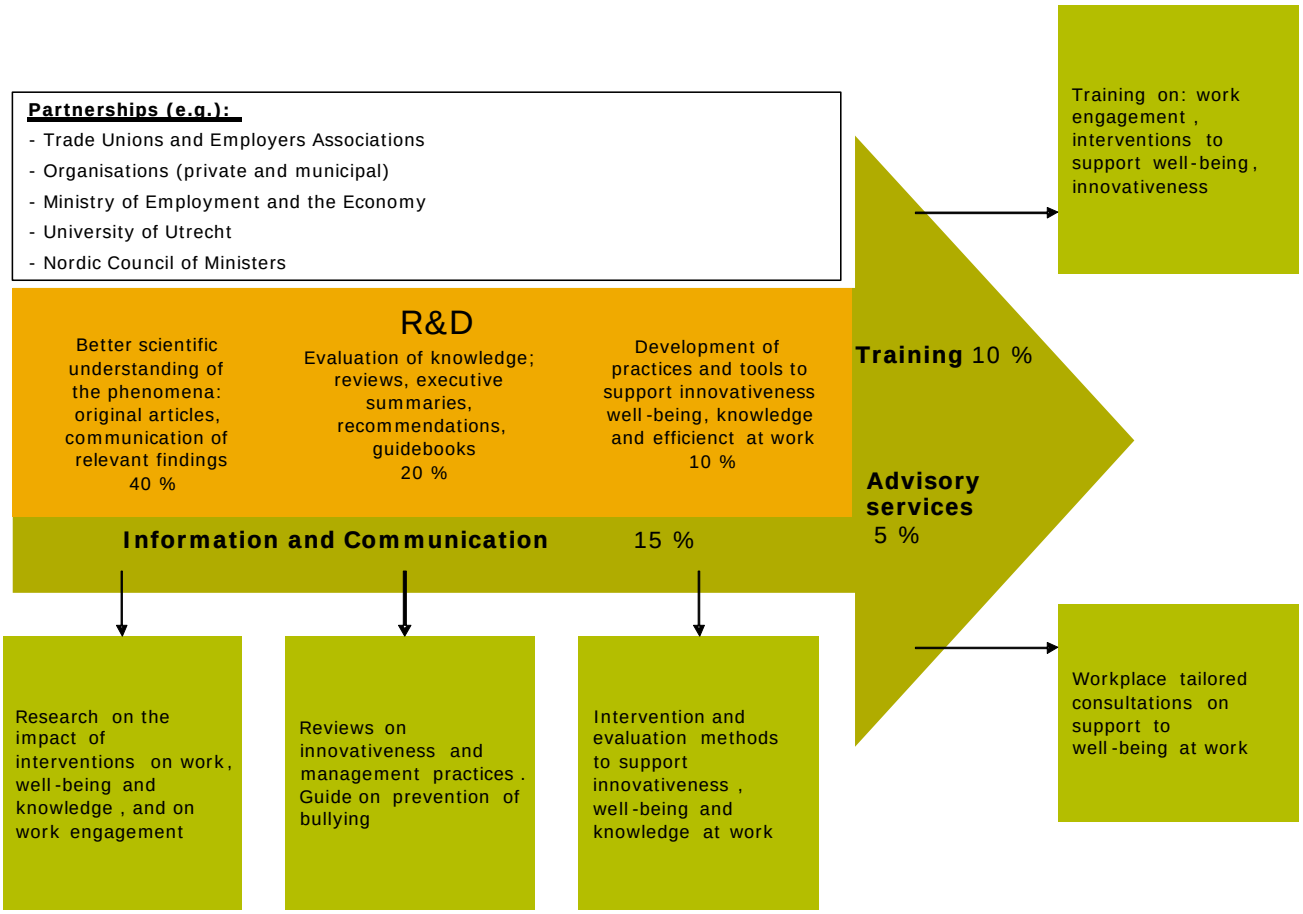


Figure 3.2.3 Allocation (%) of resources and outputs according to mode of operation.

Focal achievements

Prevention and reduction of workplace bullying

Bullying at work is recognised as a serious psychosocial hazard. During the past fifteen years, extensive research has been conducted on the issue, and the negative effects of bullying are well-known in scientific circles. Awareness of the problem and a readiness to tackle the issue has increased in organizations, but proven methods for workplace-level intervention into bullying at work have been lacking. During the current FIOH strategy period, the focus has been on the development of methods and tools that support organizations, including those for the prevention and reduction of inappropriate behaviour and bullying at work.

An intervention programme was conducted in eight elementary schools to address inappropriate behaviour and bullying. The aim of the intervention project was to reduce inappropriate behaviour and perceived bullying among the schools' personnel. The results revealed that gathering together at the workplace to discuss and examine inappropriate behaviour and bullying, including risk situations and the antecedents of bullying, yields positive results.

The EU-funded policy research project, PRIMA-EF (Psychosocial RIsk MAnagement - European Framework), has collected and analysed several of the best practice interventions for the prevention and management of workplace bullying (literature, expert interviews). The project has published an inventory of interventions for bullying, a book for policy makers, stakeholders and experts, and a booklet and ten factsheets (including e.g. best practice guidance) for organizations, employers and worker representatives. This information is also available in Finnish. Utilisation of the project and distribution of PRIMA-EF outcomes in Finland will continue during 2009.

FIOH has also published a practical booklet (End of torment - how to settle a bullying situation in the workplace) for those who perceive themselves as the targets of bullying and their supervisors. Supervisors and managers, safety and health delegates and occupational health care personnel have been trained to settle cases of bullying at work and to support both the targets and the perpetrators. An international NIVA course for researchers and practitioners, health and safety authorities and lawyers has been conducted in order to distribute the information gathered.

Vartia, M., Lahtinen, M., Joki, M. & Soini, S. (2008). Piinan loppu - kiusaamistilanteiden selvittely työpaikalla (End of torment - how to settle bullying situations at the workplace). Työterveyslaitos, Finnish Institute of Occupational Health, Helsinki.

PRIMA-EF. Guidance on the European Framework for Psychosocial Risk Management. WHO Geneva, 2008. (Psykososiaalisten riskien hallinta - Eurooppalainen viitekehys PRIMA -EF. Opaskirja työnantajille ja työntekijöille. Työterveyslaitos, 2008).

Recognition and enhancement of positive outcomes of working

The number of positive constructs associated with occupational well-being is limited. Studies about the relations of work and worker well-being have tended to concentrate on negative outcomes, such as strain and burnout. However, it is also important to recognise the positive outcomes of working and the factors associated with work that produce well-being.

Work engagement is defined as a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication, and absorption. Several studies have indicated that work engagement has positive consequences at both the individual and organizational level. FIOH participated in the validation of the Utrecht Work Engagement Scale, a method since used in a prospective follow-up study of the construction of well-being in the work of dentists and teachers.

The studies revealed work engagement is a factor that can essentially improve the quality of work. Several means of information transmission and training were used to distribute the information to the professional groups studied. The results were also very appealing to the representatives of other professions and organizations that aim to improve the well-being of their personnel and the efficiency of the organization. In the last three years, numerous lectures have been presented and popular articles and interviews have been published on the topic. Therefore, FIOH decided to develop a service product titled “Towards engaged employees and healthy workplaces” that will help organizations achieve engagement.

The new service product is a consultancy OD-project. It starts with the analysis of the situation in the work community and work and work engagement in the organization or work group. The results are discussed in a seminar attended by the personnel, and the factors requiring improvement are worked out within the organization or work group. The chain of improvement includes 3 workshops, 2 development tasks between the workshops, consulting with the supervisor and a follow-up measurement of work engagement and the factors related to it. The topics include job resources and their improvement, analysis and support of the strengths and successes of the work-unit and employees, potential and unrecognised resources and support for work engagement, and job resources in a changing work situation. FIOH organization consultants lead the process at the workplaces, and the process is supported with printed and electronic materials.

Hakanen, J.J., Schaufeli, W.B. & Ahola, K. (2008). The job demands-resources model: A three-year cross-lagged study of burnout, depression, commitment, and work engagement. Work & Stress: A special issue on work engagement, 22, 224-241.

Hakanen, J., Perhoniemi, R., & Toppinen-Tanner, S. (2008). Positive gain spirals at work: From job resources to work engagement, personal initiative and work-unit innovativeness. Journal of Vocational Behavior, 73, 78-91.

Bakker, A., Hakanen, J., Demerouti, E., & Xanthopoulou, D Job Resources Boost Work Engagement, Particularly when Job Demands are High (2007). Journal of Educational Psychology, 99, 2, 274-284.

Interventions to enhance work, well-being and expertise in workplaces

The need to improve work and organizational factors in order to promote employee well-being and expertise has been emphasised. Only a limited number of evaluated intervention studies aiming to enhance well-being and/or expertise at work have been published to date. During the period 2006-2008, FIOH published two reviews on the means to promote worker well-being and work, one review on the joint improvement of work, work-related expertise and well-being, and one review of the joint improvement of well-being and efficacy at work. FIOH also conducted empirical intervention studies on the impact of participative approaches on work, psychosocial work factors, job knowledge, and worker well-being.

FIOH conducted a study in the field of public services on participative approaches to improve work and worker well-being. The interventions improved the work climate and flow of information among workers in non-supervisory positions. The improvement of job knowledge is also a rare phenomenon. We conducted an intervention study in service work to study the means to improve job knowledge and the well-being of workers. A method to assess job knowledge in kitchen work was created in the study. Participation in the development of the work process and professional training was associated with the level of work process knowledge after the intervention. Both psychosocial work factors and well-being at work improved during the intervention.

During 2009–2010, the results of these studies will be utilised in recommendations and in a handbook about managing the well-being of work, which will be written by FIOH experts. The aim of this material is to support the management of well-being in organizations.

Elo, A-L. et al.: "Evaluation of an organizational stress management program in a municipal public work organization. J. Occup. Health Psychol. 2008, vol 13, No 1, 10-23

Kivimäki, M., Lindström; K.: Psychosocial approach to Occupational Health. In G. Salvendy (ed.) Handbook of Human Factors and Ergonomics. John Wiley &Sons, Inc. Hoboken, New Jersey, 2006, pp. 801-817

Leppänen, A. et al.: Does multi-level intervention enhance work process knowledge? J. of Workplace Learning 20 (2008):6, 416-430

3. Promoting Gender Equality and Diversity at Work Challenges of gender equality planning

Aimed impact

The Finnish government issued an action plan for gender equality in 2004-2007. The aim was to strengthen gender equality in working life, to develop gender mainstreaming, and to bring the theme of "men and gender equality" onto the agenda to further facilitate the reconciliation of work and family life. One objective was to put more emphasis on workplace-specific equality plans. A new action plan was issued for 2008-2011. Its priorities include promoting work/life balance, reducing the gender pay gap and adopting measures to alleviate gender segregation in work life.

Aimed impact process

The aim has been to increase gender equality in Finnish working life by producing new scientific knowledge and by developing tools and practical methods for HR managers and occupational health professionals. The "Work/life balance" research and development programme was launched (2005-2009) to support the balance between work, family, and other spheres of life. The programme initiated several research and development projects during 2006-2008. The MONIKKO project emphasised the importance of equality from a wider perspective taking into account age, ethnicity, and family situation. The project yielded new data and new practices, e.g., a model Equality plan, a guidebook, and a fact sheet on the Age-friendly workplace. A Diversity Barometer was carried out in order to explore Finnish HR mangers' attitudes to workplace diversity. All these actions have been carried out in close co-operation with a wide-ranging network of relevant partners, both national and transnational. The resulting recommendations have benefited governmental action plans for equality, and the results have been widely disseminated to workplaces.

One element of the diversity concept is the integration and reintegration of disabled people into ordinary employment. An Accessible Workplace Method (AWM) and an electronic databank on good practices of accessibility have been developed by FIOH in partnership with all relevant actors in Finland. This is in accordance with the OECD report (2008) which emphasised the meaning of bringing people with disabilities and health problems back to work; it raises the income and quality of life of the people who can and often want to work.

Diversity and multiculturalism in Finnish working life will grow as the number of people with immigrant origins increase. The Finnish immigration policy actively promotes work-related immigration; therefore, new studies have been initiated on good workplace integration practices in cooperation with health and safety professionals and HR managers. The aim is to promote the development of a healthy, inclusive and multicultural workplace culture in Finland.

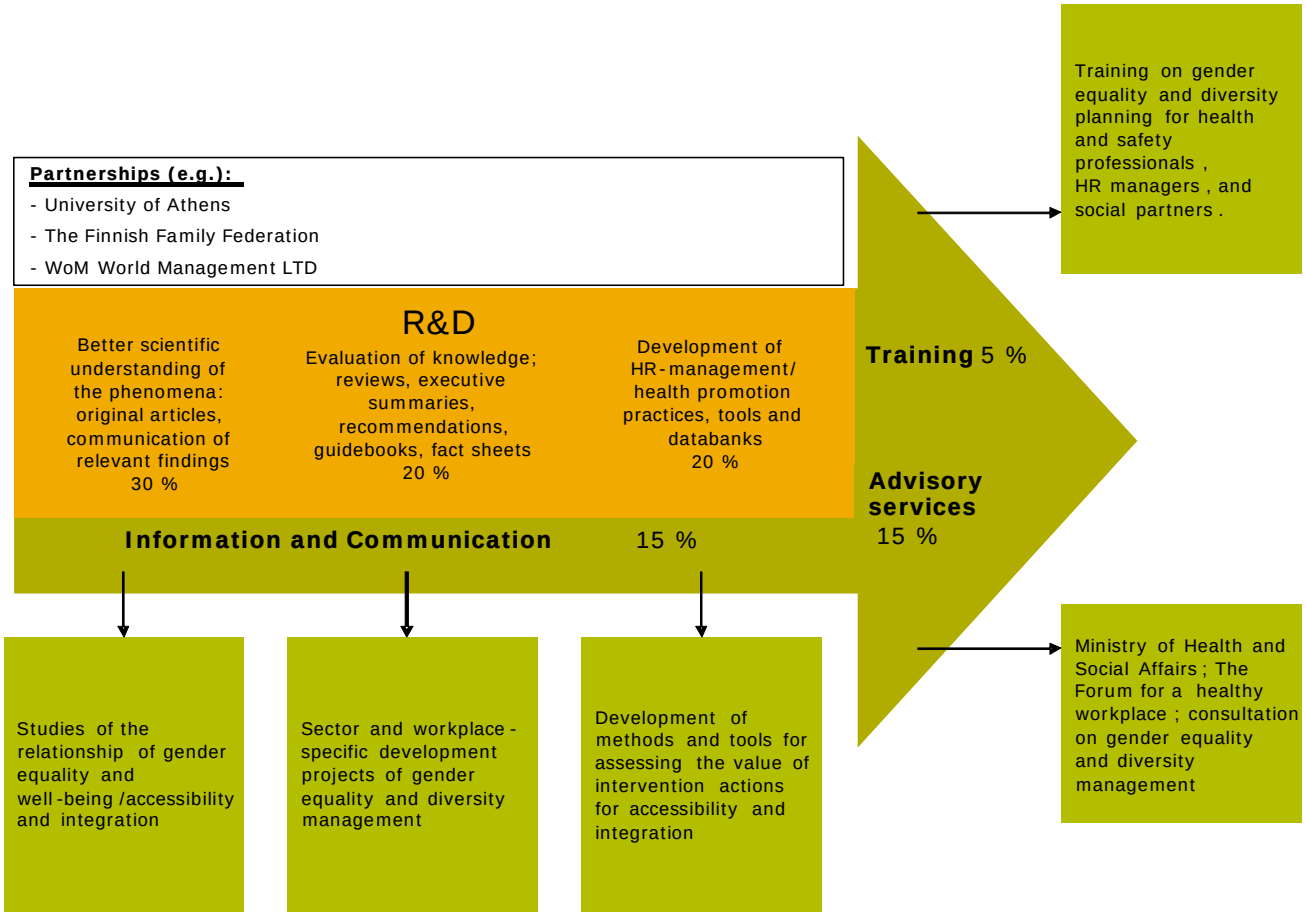


Figure 3.2.4 Allocation (%) of resources and outputs according to mode of operation.

Focal achievements

Challenges of gender equality planning

According to the Finnish Equality Act, companies and workplaces that regularly employ over 30 people are obliged to draw up an equality plan. The Act was amended in April 2005 to put more emphasis on equality plans as an instrument to promote gender equality in the workplaces. Other aspects belonging to equality (e.g., ethnic origin, age, disability) can be included in an equality plan if this is deemed necessary in a workplace.

The objective was to assist workplaces in their equality planning and to encourage other enterprises towards equality planning by producing good examples. Four companies representing Finnish Technology Industries, five small and middle-sized companies in Southern Finland, and one German metal company in Göttingen were selected for the project. About 270 000 people work in technology industries in Finland today. Of these, only 23% are women. One aim was to attract more women into the male-dominated metal industry; the other aim was to analyse how family leaves affect male and female wages, career possibilities and well-being upon return to work.

An equality plan was prepared in close cooperation with the staff in each company. The equality plan was seen as a useful instrument by means of which the workplace can promote gender equality and diversity. A multi-dimensional concept of equality was applied in all cases. The results show that with good workplace design, more women can be attracted to male-dominated workplaces, while a family-friendly workplace can be a motivating factor for women to return back to work after maternity/parental leave. It can also encourage more men to use parental leaves.

Feedback seminars and dialogue groups were organized in the participant workplaces. A guidebook and fact sheets on gender equality planning were published, and a model equality plan as a step-by-step process was prepared targeting Finnish small and medium-sized enterprises in particular. Big industries and workplaces have been more active in equality planning than smaller companies, for whom it has been more difficult to see the benefits.

The number of equality plans has increased in Finnish workplaces. In 2004, only 26% of HR managers said that an equality plan was drafted at their workplace, while the corresponding figure in 2008 was 60% as surveyed by the Workplace Health Promotion barometer. There is also a growing interest among other EU countries in equality planning as an instrument by which equality and diversity can be promoted at workplaces. Proof of this is a new EU project entitled "Gender Equality and Diversity at workplaces" which began in 2008 and is funded by the EU's Lifelong Learning Leonardo da Vinci sub-programme (2008-2011).

Mustakallio, S. et al. (2008): How to succeed in equality planning. www.wom.fi

Lilja, R., Asplund, R. & Kauppinen, K. (eds.). Do the choices and costs of family leave hamper gender equality in working life? Helsinki 2007. Reports of the Ministry of Social Affairs and Health, Finland, 2007:69.

www.MONIKKO.net

Multicultural workplaces and integration of immigrant workers

During the past couple of decades, Finland has transformed from a country of migration to a country of immigration. A mere ten years ago, the net immigration consisted of approximately 3 500 people per year, now, the number has more than tripled. As immigration increases, the immigrants themselves come from increasingly distant places. This is connected to such things as refugee background, the impact of globalisation, and to Finland's mounting employment shortage due to the ageing population. Today, the Finnish immigration policy actively promotes work-related immigration which is also reflected by the current government programme.

During the FIOH strategy period (2006–2010), new studies have been started on good workplace integration practices in cooperation with health and safety professionals and HR managers. A questionnaire study was carried out in 17 public and private sector workplaces, with 208 immigrant and 600 Finnish workers. The aim was to gain new information regarding multicultural work organizations, to increase knowledge of the psychosocial work conditions among immigrants, and to produce information on the promoting factors of well-being among immigrant workers. A further aim was to disseminate new knowledge to relevant target groups and policy-makers. The project received much public interest while numerous interviews were given; feedback seminars were also held in the participant workplaces.

In addition, researchers at FIOH have been coordinating and leading partnership with the National Institute for Health and Welfare and Finnish Rehabilitation Foundation, a research consortium funded by the Consultative Committee of Ministries. The objective is to update existing information and direct future research on integration policies and practices in Finland. This information is badly needed, as the Finnish immigration policy faces new challenges due to the rapidly increasing number of immigrants.

Vartia M. et al. Multiculturalism in everyday working life, Finnish Institute of Occupational Health & Ministry of Labour, Tampere 2007.

Rintala-Rasmus, A. 2008. Identity Adaptation of Immigrants. University of Jyväskylä & Finnish Institute of Occupational Health. (PsychLic).

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: ++

- The scientific knowledge FIOH has published in this area meets high standards. The knowledge produced is also applicable and transferable to the development of FIOH's services for workplaces, in training courses for Finnish workforce and in popularised forms for all Finnish citizens. FIOH also applies knowledge from other international sources. Illustrative examples are the high-level scientific publications from the one "Unit of excellence of psychosocial factors at work" and the practical organizational development methods for workplaces like promoting work engagement, change workshops and Better Work Organization (ParTy) survey method.

Efficiency of implementation process and methods applied: ++

- The implementation of FIOH's research results to workplaces occurs through specialised training courses for occupational health psychologist and training for managers and HRD experts.
- The usability of the tools developed by FIOH is good and they are widely used in organizations and OHS services. Many of these methods have been developed together with FIOH's Nordic companions. During this strategy period FIOH also invested to improve the quality of FIOH's expert services and their custom-oriented delivery

Partnerships: ++

- The partnerships and co-operations with other actors in working life and OH issues are functioning effectively. Cooperation with OHS and OH experts is intensive. Also the collaboration with social partners is very good in the service sector, in the social and welfare sector, in the paper industry and in academic sectors such as dentists, teachers, and municipal employees unions.
- The collaboration with workplaces from all sectors in issues of work and well-being promotion is frequent. FIOH's partnerships in EU activities and global networks are regular.
- The Bilbao Institutes Topic Centre activities have created good bases also for networking within EU and WHO activities globally.
- Collaboration with Finnish universities has been traditionally strong in the field of work and organizational psychology. Three of FIOH's researchers hold a part time professorship and 10 of researchers' serve as adjunct professors at Finnish universities. An important collaborative effort with one university is specialised training for work and organizational psychologists in Finland.

Potential impact of produced outputs: +++

- FIOH's potential impact is high, because FIOH has been the main actor in the field of organizational psychology both in research and practice for years. FIOH has e.g. introduced both concepts of stress and burnout into Finnish research and occupational practice and has started or supported discussions on job engagement, innovations at work and simultaneous improvement of work and well-being.

- In the public image, the institute is regarded as trustful, neutral, and skilled in collaboration.
- However, FIOH needs to train its means to recognise weak signals indicating changes at working life, and to increase its agility in practical actions to meet the actual problems and challenges as quickly as possible.

Achieved impact: ++

- FIOH's psychosocial approach is well known as a part of Scandinavian working life research and expert tradition. This position has been also partly achieved through collaboration with EU, US and WHO collaboration.
- FIOH has achieved high-level scientific and practical results in handling functional and structural changes at work places. In the present changes in the municipal and health care sector, these competencies are now in full use.
- Achieved impact can be seen in scientifically high-level research publications in the field of psychosocial factors at work. Practical applications based on research are in use in workplaces. These include methods to survey psychosocial positive and negative factors at work and consultative support for workplaces with their problems or in improving their quality of life and the well-being of employees.

3.3 Each citizen equipped to ensure his or her occupational safety and well-being

Overview

Aimed impact

Health and work ability of working population are debilitated by unhealthy habits, such as excessive alcohol consumption, smoking, unhealthy diet and exiguous physical activity and exercise. These habits are associated with the development of lifestyle diseases that cause work disability and early graves. On the other hand, healthy habits promote work ability and recovery from stressful work. Each citizen may influence by his or her own choices on his/her well-being, as well as on the well-being of fellow workers. Information on factors that promote or endanger health helps one make the right choices. Each citizen can actively affect and develop the well-being and safety at his/her own workplace in many ways.

The general aim of this strategic goal is to produce and disseminate practical and actual information for citizens on relationships between working life, healthy habits and well-being, and to impress and establish good practices of health and safety promotion at workplaces.

Main impact processes

In the dissemination of information, the web site is one of the most important means of communication for citizens and occupational health & safety personnel. FIOH's web service (www.ttl.fi) is under intensive progress. Another way to disseminate information is to produce popular and practical publications and articles, e.g. self-help guide books, the Työ Terveys Turvallisuus (Work Health Safety) periodical educational material: text books and hand books.

The experts of FIOH actively participate in production of publications, training activities as well as in public discussion on trends of working life and issues of occupational well-being, safety and health promotion. In the latter activity, good relations with the media (TV, radio, press) and decision-makers are important.

Another way to implement the aim of this strategic goal is to directly influence the behaviour and actions at workplaces. Development of activities and training in collaboration with employers, employees, occupational health services of work organizations and with other actors in the field of health promotion (health related organizations, authorities, educational and research institutes) is an effective way to spread out, maintain and promote good practices, suitable solutions and tools for health and safety promotion and good life style choices at workplaces, and implant them into daily life at the workplaces.

Summary statistics

The planned resources in 2006–2008 for this strategic goal have been around 10–15 person years.

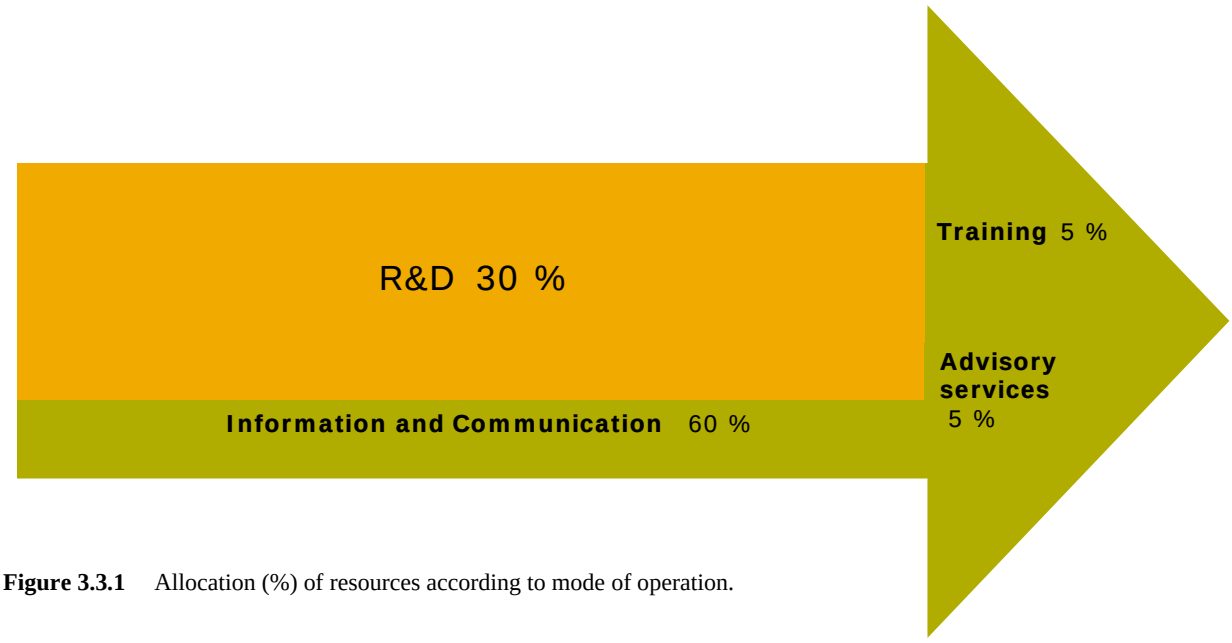


Figure 3.3.1 Allocation (%) of resources according to mode of operation.

Programmes

1. Citizens' awareness of their Occupational Health

The objective of this programme focuses on disseminating information produced by other programmes and FIOH's experts. The aim is to spread information on good practices among the citizens and actors in the field of health promotion and occupational safety. Based on the information, citizens are able to make choices concerning their own way of life. The main themes are mental health and stress, family and work, diet, smoking, alcohol, physical activity, sleep and learning.

The themes have been dealt with

- on FIOH's website

- in the Työ Terveys Turvallisuus periodical
- in interviews of FIOH's experts on radio channels
- in press releases
- in several publications and information material
- on e.g. the Helsinki Book Fair and several exhibitions

FIOH has also collaborated with Duodecim Medical Publications Ltd, The Terve Suomi (Healthy Finland) portal in order to spread out information produced by FIOH via partners' channels in order to reach as large a part of the population as possible. FIOH has also made a contract with the media company Tarinatalo to offer expertise on working life in the production of a TV-programme series dealing with the happiness of life. The company will produce the program series for the Finnish Broadcasting Company during 2009.

As an example of collaboration at the EU level, FIOH has participated in the Move Europe Campaign. The aim of the campaign is to improve life-style-related health promotion at workplaces in various European countries.

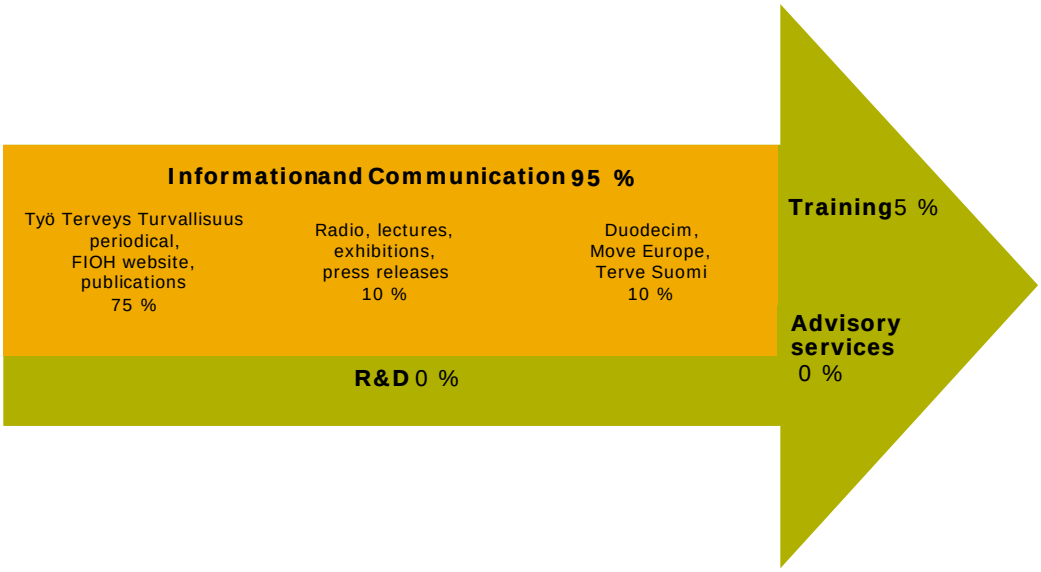


Figure 3.3.2 Allocation (%) of resources and outputs according to mode of operation.

Focal achievements

Tobacco legislation reduces exposure to tobacco smoke in restaurants

Exposure to environmental tobacco smoke (ETS) is one of the most important and serious work-related health risks and can lead to cancer, cardiovascular and respiratory diseases which can be prevented. Lung cancer is more prevalent among restaurant workers than the general population, not only because of their preference for daily smoking but also because of an exposure to work-related tobacco smoke.

FIOH has had an important role in reducing work-related exposure to ETS in workplaces. FIOH has participated as an active partner in the legislation process, providing necessary information to the decision makers concerning work-related exposure to ETS and developing the best practices in preventing workplace exposure. In addition, FIOH has disseminated information to occupational safety and health authorities concerning the measures needed in order to comply with the renewed tobacco legislation.

In the past, FIOH has carried out national surveys concerning the assessment of occupational exposure to tobacco smoke in workplaces, including restaurants. The survey concerning restaurants was performed under the Ministry of Social Affairs and Health in collaboration with the National Restaurant Workers Union (and the Finnish Restaurant Owners Association).

Follow-up surveys conducted by FIOH found that the Ministry was obliged to change tobacco legislation in order to restrict smoking in restaurants. The FIOH survey showed the renewal of the Tobacco Act in 2000 was not strict enough to prevent work-related ETS exposure, and over 50 % of restaurant workers were exposed to ETS for more than 4 hours per each working shift. According to the measurements of ETS in restaurants, an increase could be detected in the mean nicotine concentration. After this survey, the Tobacco Act was rewritten and smoking was prohibited in all restaurants.

Thanks in part to FIOH efforts, the Tobacco Act of June 2007 will significantly reduce exposure to ETS. In June 2009, more than 10 000 restaurants and cafeterias will become totally smoke-free and over 70 000 workers will be spared exposure to tobacco smoke in restaurants. Annual work-related deaths caused by ETS exposure in Finland are expected to drop by 30-50 % due to the reform of tobacco legislation. The new ban on smoking in restaurants will decrease the risk of developing lung cancer and other tobacco-related diseases both among workers and clients.

This renewal of tobacco legislation prevents ETS exposure for thousands of restaurant clients and reduces the number of new smokers who may be inclined to smoke during their visits to restaurants. This has had a significant impact on the attitudes towards smoking in the general population. According to recent surveys, the majority of non-smokers and almost half of the smokers in Finland now accept, and are in favour of, total smoking bans in restaurants. What is more, smoke-free restaurants encourage young clients to stay non-smokers.

2. Making the Workplace as an Arena for the Health Promotion

Workplaces have many under-utilised possibilities and opportunities to promote health and well-being. As almost 50 % of the population (about 2.6 million) in Finland is involved in working life, workplaces are the essential arenas for effective actions of health promotion (WHP).

The aim of this programme is to create opportunities for good healthy behaviour and to offer healthy life style choices at workplaces. Actions are targeting the enhancement of healthy behaviour, healthy work communities and work environment. The focus is to maintain and promote factors which protect and strengthen health at workplaces. The objective is also to spread good workplace health promotion practices, solutions and tools to workplaces.

The main target groups are different actors in the field of workplace health promotion (employers, employees, occupational health services) at workplaces in various branches.

Specific themes of the programme have dealt with alcohol prevention (e.g. brief intervention for OHS and alcohol prevention tools and model for workplaces), promotion of healthy dietary habits of professional drivers, promotion of workplace exercise, creation of criteria for healthy workplaces, and tools and good practices for workplace health promotion.

The programme has also carried out research and development activities, training, dissemination of information and implemented good practices and tools for workplace health promotion.

The partners in cooperation include social partners, ministry of social affairs and health, pension insurance companies, research institutes, occupational health services and many workplaces.

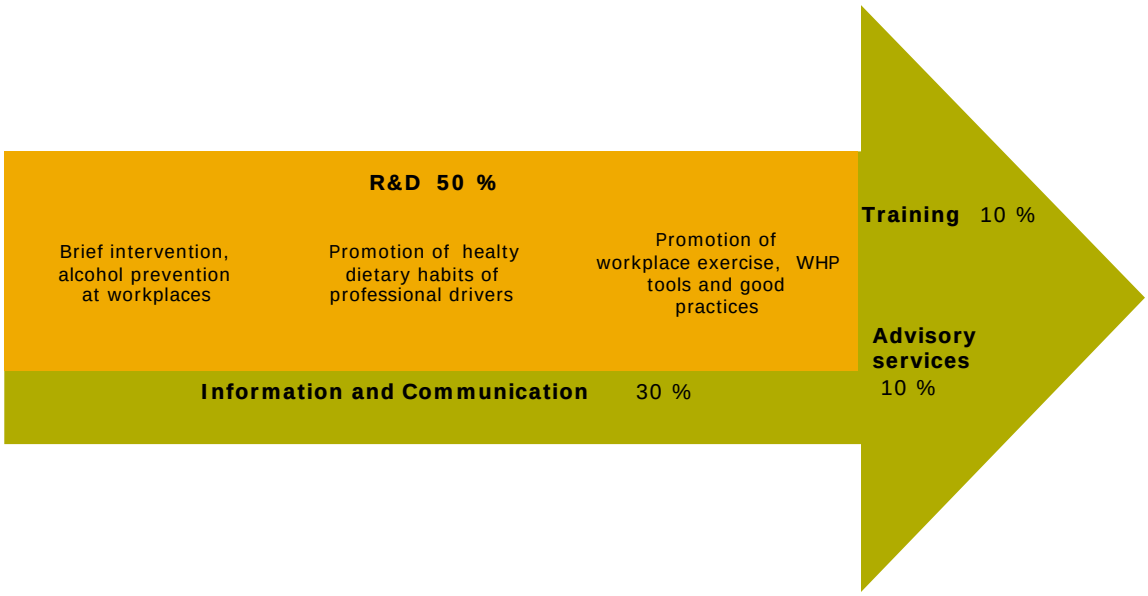


Figure 3.3.3 Allocation (%) of resources and outputs according to mode of operation.

Prevention of the harmful effects of alcohol at workplaces

In Finland, heavy drinking is common among working people (10% of women and 40% of men scored 6-12 with AUDIT-C in 2006). The effects of alcohol on health are widely studied and the cost of problems caused by alcohol is known to be high. However, the harmful effects of alcohol-related problems have not been previously studied at Finnish workplaces. According to our baseline study, 40-71% of employees had seen harmful effects of alcohol-related problems in their work community in the last year (including such incidents as being hungover/drunk at work, being late/absent, neglecting work/ineffectiveness, a decrease in the quality/quantity of work, problems in cooperation, and accidents/near misses).[1, 2]

Early identification (e.g. information, training and tools) to prevent alcohol-related problems and risky driving are needed both at workplaces and in occupational health services (OHS). Cooperation between the OHS and workplaces is crucial. In addition to its health hazards, excessive drinking threatens work-related well-being, occupational safety, and the productivity of labour.

The objectives of this 2007-2009 intervention study are as follows:

- to study the work done in workplaces and the OHS in order to prevent the harmful effects of excessive alcohol use,
- to study the changes in prevailing practices during the intervention,
- to study the effectiveness of intervention and
- to develop a model for early identification deriving from the needs identified in the workplaces, and adopt its systematic use. The model is being developed in collaboration with four Finnish workplaces (a university department, a civil service department, a hotel and catering business and a stevedoring company, for a total of some 3,600 subjects) and their OHS (some 70 subjects), four other comparative workplaces and their OHS, and a group representing a diverse expertise in work life (labour market organizations, The Centre for Occupational Safety, the National Research and Development Centre for Welfare and Health, The Social Insurance Institution of Finland, and the Finnish Institute of Occupational Health).

FIOH interventions at the workplaces include

- a questionnaire study of the entire workplace personnel,
- reporting and processing of the results,
- training key persons to tackle alcohol issues,
- training OHS personnel to perform brief interventions,
- joint training for workplaces and OHS to developing cooperation in preventive work,
- developing Workplace Alcohol Policies and
- introducing and monitoring use of the A-Step tool.

The objective is to develop all of the tools and implementation methods listed below:

- Training programmes in 2008-2010 (training for superiors, occupational health professionals; including their co-operation in preventive work)
- Campaigns and materials in 2008
- A-Step tool: Steps for early prevention of alcohol’s harmful effects at work in 2009
- Alcohol and Work on FIOH's web site in 2009
- The Model for Preventive Alcohol Policy for Workplaces in 2010
- Questionnaire about the harmful effects of alcohol use at work in 2010

The objective is that by 2012, 75% of the OHS and 10% of Finnish workplaces have used the A-Step tool for developing a preventive alcohol policy. Use of the A-Step tool and The Model for Preventive Alcohol Policy for Workplaces, the harmful effects of alcohol in workplaces and brief interventions in OHS will be monitored with both FIOH's surveys and other surveys, in cooperation with other institutes.

Heljälä, L., et al.: Self-reported brief intervention activity in Finnish occupational health services. 5th International Conference of INEBRIA. Alcohol & Drug problems in Developing Countries. The Role of Brief

Intervention for Improvement of Care and Prevention. Bulletin of INEBRIA LATINA. Supl. 1, 2008. p. 28 (abstract)

Jurvansuu, H. et al.: Counseling for heavy drinkers in a Finnish occupational health services - the patients' perspective. 5th International Conference of INEBRIA. Alcohol & Drug problems in Developing Countries. The Role of Brief Intervention for Improvement of Care and Prevention. Bulletin of INEBRIA LATINA. Supl. 1, 2008. p. 29 (abstract)

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: ++

Research and development activities in this strategic goal have started well during this strategy period. FIOH has gained funding from different external sources (e.g. The Academy of Finland) in this competing area. Experts in FIOH have vast research experience on the topics of health promotion, and they have the ability to apply their knowledge to practical situations. For example, all produced information in publications is based on experts' texts, interviews or research results. Scientific and popular articles, publications and presentations/lectures have been released both at the national and international levels.

Efficiency of implementation process/methods applied and potential impact of produced outputs: ++

The output of on-going R&D projects will produce tools, methods and other possibilities to strengthen and improve effectiveness of the action in the future. However, the action taken for the changes take time in terms of which the three years is a relatively short time. FIOH has managed to awaken public interest towards the topics of health promotion. The citizens are a large group with different needs and capability to receive and use the information. FIOH still has to learn more about how to identify target groups and to edit its messages to an understandable form. Also, the efficiency of the publication process could be improved.

Use of partnerships and cooperation in improving effectiveness: ++

FIOH has an active and versatile partnership network in this field. The effectiveness of the action will be gained by collaboration with mediating partners (occupational health services, professional organizations, pension insurance companies, health promotion organizations) which have the same interests as FIOH. Benefits of the partnership and collaboration will increase during the following two years. More attention should be paid to local collaboration in different parts of Finland.

Achieved impact: +

This strategic goal gathers products of information and communication produced by the other strategic goals. It is natural that volumes will increase by the end of the strategy period. Objectives have been achieved well so far. Several R&D projects have started in the field of health promotion. However, the final achieved impact of actions and the contribution of FIOH to specific impacts are difficult to estimate as many actors are working within this field, and

three years is too short a time period to make conclusions on permanent changes in citizens' behaviour or work ability.

3.4 Providing authorities with information for promoting occupational safety and health

Overview

Aimed impact

Protecting the workforce and ensuring social welfare and health care services are among the fundamental tasks of public authorities. Reliable, up-to-date information on the effects of work and working life structures on health is needed as background for legislation and structural steering. Information is also needed on the magnitude and prevalence of health effects.

Boosting workforce participation is a key national goal. The solutions made in social welfare and workplace development have an impact on people’s participation in working life.

Public funds must be deployed as effectively as possible in the development of occupational health services (OHS), labour inspection organization and of workplaces. In order to ensure this, developmental projects, surveillance and evaluations are needed. The variation in quality of OHS is great. FIOH's role and approach into the R&D of OHS in Finland is a systems approach which means operations at the societal (macro-), health services (meso-) and workplace (micro-) levels. Due to the great regional variation in the incidence of occupational disease, the diagnostic services for occupational diseases must be developed.

The general aim of this strategic goal is to provide the authorities and other decision makers like the members of parliament and social partners (unions and employers' confederation) with brief and understandable information of occupational health and safety research results.

Main impact processes

Information to the authorities and other decision makers is delivered through expert opinions on pronouncements for ministries and authorities, participation in working groups and task forces of the ministries and other authorities and social partners - in Finland all decisions regarding the development of OS&H are discussed tri-partially, e.g. together with social partners and government. Electronic newsletters, net information and seminars are ways in delivering the latest research results to decision makers.

Regular surveys on occupational safety and health are carried out tri-annually. They include Work and Health surveys, Work Ability Barometer and Survey on OHS. Some industry-based surveys are also done based on the current needs. The results of these surveys are rapidly published and relevant results, including the recommendations of actions needed, will be given directly to the decision makers, e.g. in tri-partial meetings in the ministry of Social Affairs and Health. These results are also published in the specific internet/extranet information system, which is constructed particularly for the OS&H authorities and OHS providers.

Developing OHS-system requires data on the current situation of the contents and quality of OHS. Based on research results, FIOH makes developmental interventions together with local providers of OHS, especially to develop municipal OHS. FIOH provides data for the information steering of OHS, consultation, training and education, not only of the OHS professionals but also employers and employees. The target population for FIOH's developmental projects is not only the working population but also persons in work-life marginal.

Summary statistics

The planned resources in 2006-2008 for this strategic goal have been around 35–40 person years.

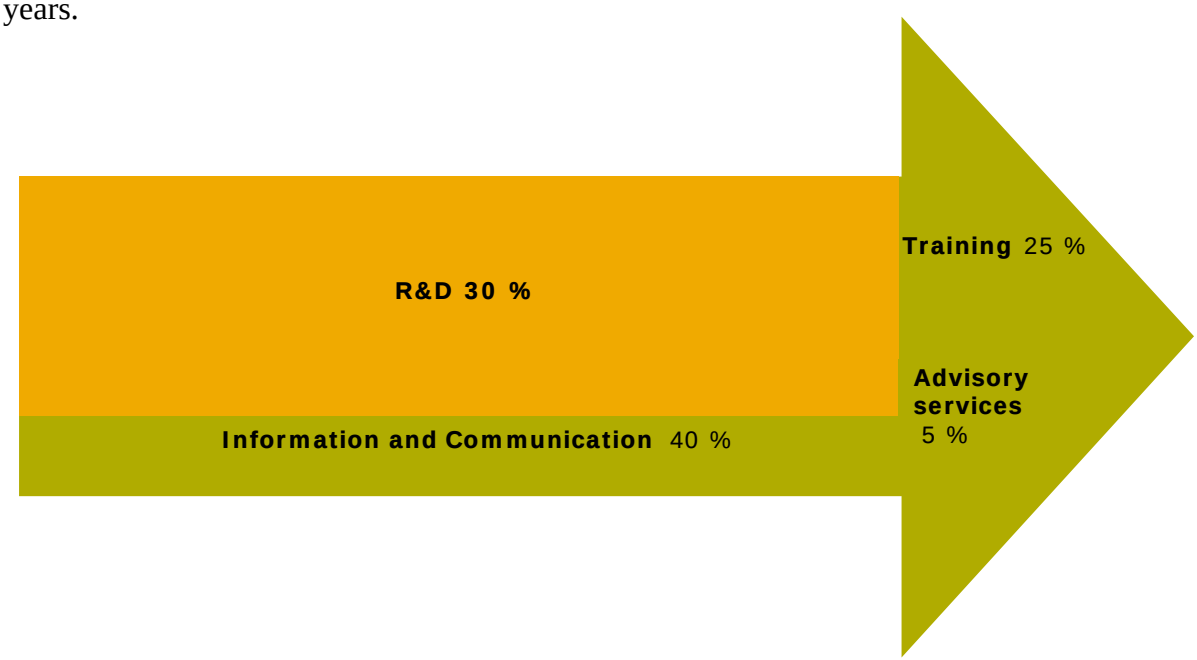


Figure 3.4.1 Allocation (%) of resources and outputs according to mode of operation.

Programmes

1. Providing authorities up-to-date information on occupational health and safety research

Aimed impact

Authorities need up-to-date information on occupational health and safety research results in order to have a solid foundation for legislative work and policy guidance. The aim is to provide the authorities and other decision makers like the members of parliament with brief and understandable information on research results. Also, the interaction and discussion between researchers and decision makers, both in private and public sectors, is encouraged and needed.

Aimed impact process

To achieve these aims, FIOH gives out about 50–60 expert's opinions or pronouncements for ministries and authorities; the experts of FIOH participate in about 300 working groups of the ministries and other authorities. FIOH has developed a questionnaire for the experts participating in the groups in order to find how strong FIOH's impact is e.g. in new legislation. The researchers are encouraged to actively bring out the research results and the health and safety aspects of work.

FIOH publishes an electronic newsletter which is delivered by email to 3 500 persons. The newsletter comes out six times a year and provides information on both Finnish and international research results and information on services, products, training of FIOH and events provided and organized by FIOH.

In January 2008, FIOH organized a seminar, "Horizon 2025", which was very well received. Almost 300 decision makers from private and public sector took part in the seminar, the theme of which was the future of work. Examples of future work were from Retail Trade and Hospital work. The Seminar was opened by the Minister of Social Affairs and Health, Paula Risikko. The panel discussion was one of the best parts of the seminar according to the participants; the members of the panel represented Nokia, the Confederation of Finnish Industries EK (Director General Leif Fagernäs) and The Central Organization of Finnish Trade Unions SAK (President Lauri Ihalainen), Novetos Group and FIOH. The next Horizon seminar will be organized in 2010.

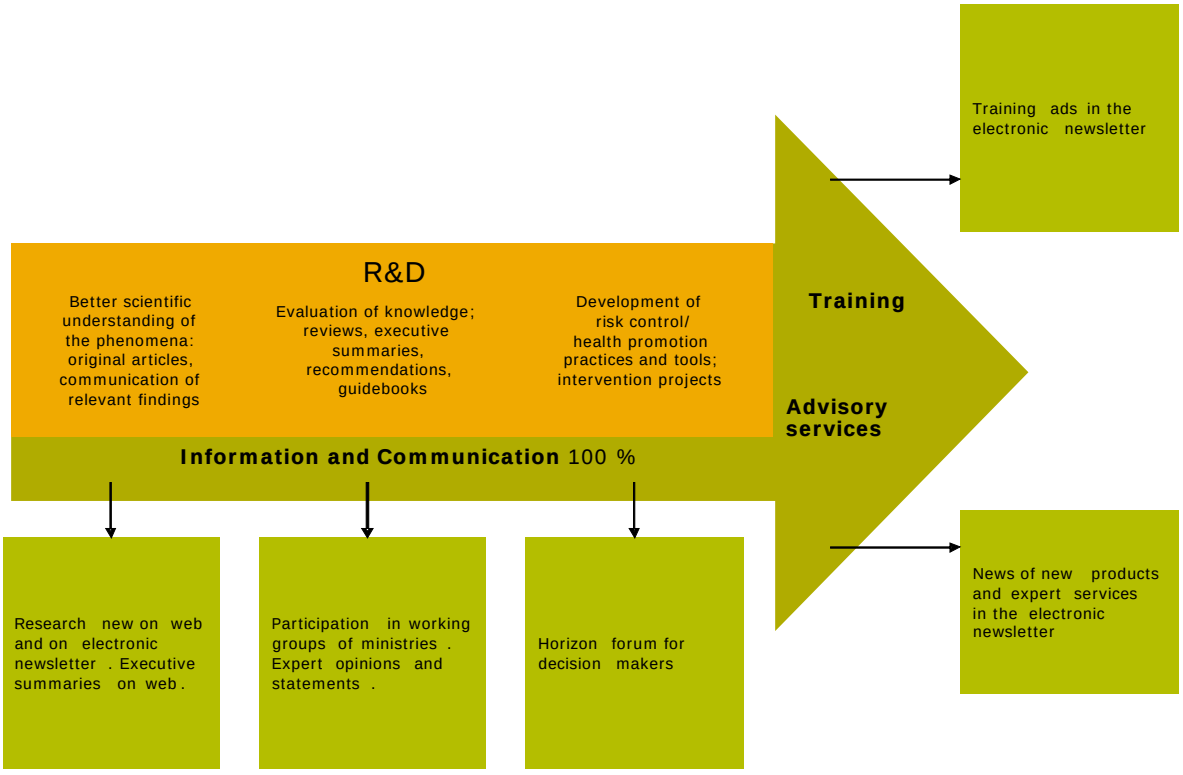


Figure 3.4.2 Allocation (%) of resources and outputs according to mode of operation.

Focal achievement

Electronic Newsletter of the Finnish Institute of Occupational Health

Authorities need up-to-date information on occupational health and safety research results in order to have a solid foundation for legislative work and policy guidance.

The 2004 evaluation of FIOH found that the use of FIOH web sites should be increased, and its electronic publishing should be further developed. The most relevant and valid scientific knowledge of international occupational health institutes should also be made more readily available.

To provide public authorities with the most recent information, we began to publish an electronic newsletter communicating Finnish and international research results and relaying information on services, products, training, and events provided and organized by FIOH. Our web site displays a longer list of research results.

The Newsletter is distributed 6 times per year to 3 500 decision makers and clients.

However, more marketing actions are needed in order to increase the use of the Newsletter.

In 2009, an Electronic Journal directed towards young workers will be published. The Electronic Newsletter and the Electronic Journal will work in co-operation and complement each other.

2. Providing authorities with information on trends in occupational safety and health

Aimed impact

The aim is that national and regional authorities responsible for occupational health and safety (OH&S) obtain and efficiently use all relevant information on the state and trends of OH&S in Finland for the promotion of health and well-being of the working-age population.

FIOH produces, collects, analyses, interprets and disseminates this kind of surveillance information to support authorities, particularly the Labour Safety Unit of the Ministry of Social Affairs and Health, and the regional labour safety inspectorates. The authorities can use information in the planning and focusing of their activities and in the follow-up of the effectiveness of their intervention activities. The dissemination of surveillance information is not limited to the authorities. Reliable information on working conditions and health is needed and used also by workplaces, occupational health services, researchers, and other national and regional actors.

Aimed impact process

The provision of good-quality information on OH&S to the authorities requires that relevant data will be regularly collected, statistically analysed, correctly interpreted by experts, and rapidly distributed to the persons and organizations which are expected to use it.

FIOH has designed and carried out many surveys on OH&S. They include a Work and Health survey (telephone interview of working population every 3 years since 1997), a Work Ability Barometer (telephone interview of the representatives of employers, employees and occupational health services every 3-4 years since 1998) and a Survey on Occupational Health Services (questionnaire inquiry of all occupational health service units every 3-4 years since 1992). In addition, some industry-based surveys (agriculture, health and social sector) and surveys on specific topics (e.g., burnout, future expectations of employees) have been carried out. FIOH also maintains several registers on issues related to OH&S (occupational diseases, exposure to carcinogens, industrial hygiene measurements, biomonitoring measurements) and expert-judgment databases (FINJEM exposure information system). Data are also obtained from other partners, such as Statistics Finland, the Federation of Accident Insurance Companies and the Social Security Institute.

Data are analysed and interpreted by FIOH experts regularly. FIOH surveys and registers produce reports which are distributed in print and freely through the Internet. A specific Internet/Extranet information system has been constructed particularly for the OH&S authorities (Working Conditions in Finland, see the focal achievement). This information provision system is being developed in collaboration with OH&S authorities and partners of FIOH.

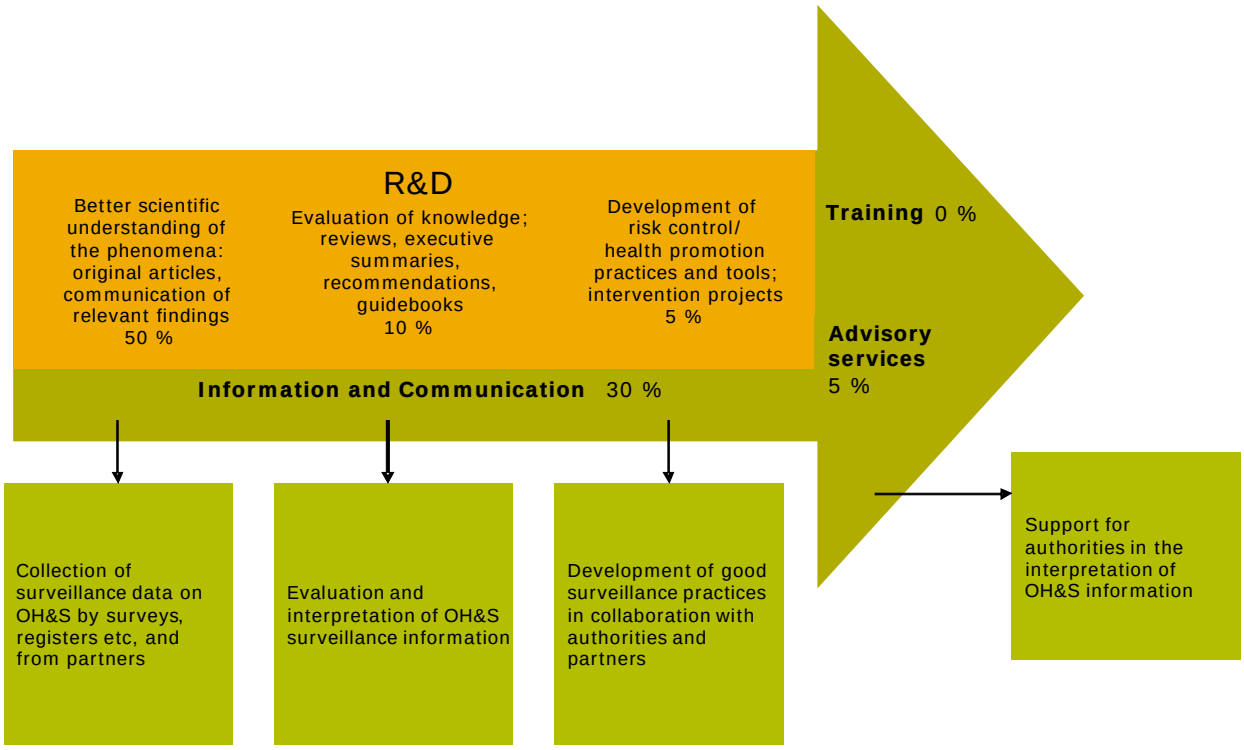


Figure 3.4.3 Allocation (%) of resources and outputs according to mode of operation.

Focal achievement

Working Conditions and the Health Information System in Finland

Occupational health and safety (OH&S) authorities, occupational health service units and other national and regional actors need reliable data and information on the state and trends in OH&S in Finland in order to focus their activities and to follow the effectiveness of these interventions. Both national and regional information is useful in the prevention of risks and promotion of health. In addition, workplaces need industry-specific data on major risks, e.g. on work accident rates to be used as a reference in the planning of their own OH&S activities.

In collaboration with the representatives of the Ministry of Social Affairs and Health and regional labour safety inspectorates, FIOH has developed an information system which includes key data on working conditions and health in Finland and its 20 provinces. This information system, Working Conditions in Finland, was planned and constructed in 2006-2007. The national information was made freely available to all interested parties on the Internet website of FIOH, while regional information was distributed to labour safety authorities and local FIOH units via Extranet. The information is updated whenever new data becomes available.

The information system will be extended and its use will be further promoted in the future, in collaboration with the Ministry and regional authorities. The plan is to add data on new topics (e.g. occupational health services, work disability) in order to construct region- and industry-specific OH&S profiles, to cover new risks, health inequities and costs of health hazards, and to incorporate more graphics and maps in order to make the system as user-friendly as possible. The interactive use of the system will be encouraged e.g. with opinion polls on the website, the FIOH electronic newsletter, by regional press releases and by a new user interface for experts and researchers (www.ttl.fi see Työolot Suomessa).

3. Improvement of effectiveness in occupational health services (OHS)

Aimed impact

In effective OHS, services are comprehensive and homogeneous to every client and updated knowledge is available from the OHS production system. For the years 2006-2010, the aim is to support the development of municipal OHS providers that produce services of the lowest quality due to the lack of resources and competence, especially on small countryside OHS units. Activities in OHS should be effective and evidence-based. Personnel in OHS should be qualified. FIOH's activities have been planned to focus on improvements and impacts on municipal OHS units and the overall quality of OHS processes by updated knowledge production, information steering, research and development projects, consultation, publication, education, affecting legislation and the reimbursement system. FIOH improves implementation by networking with OHS decision-makers, tripartite actors, OHS providers and both employers and employees.

Aimed impact processes

Authorities have up-to-date and good quality follow-up data of OHS.

FIOH has improved its data-collecting system of OHS during the years 2006-2008. In the early 2000's, there was a 2-3-year delay of new data. But comprehensive data of OHS inputs, outputs and activities concerning 2007 and personnel and qualification in spring 2008 has been available since October 2008, and the survey *Occupational Health Services in Finland in 2007* is in press.

To be effective, activities in OHS should be produced according to the "Good Occupational Health Service Practice" and based on evidence. In 2007, *Guidelines of Good Occupational Health Service Practice book* was published as an expert consensus based on a renewed OHS Act. A large research project on core processes in OHS (Rainbow) started in 2005 and will continue until 2010. Through this, FIOH has obtained knowledge to further the development processes and focus on good practices in the processes. Through improving processes, quality also improves. Practice guidelines for 2 main processes have been constructed.

In 2008, in order to facilitate big changes in municipal OHS provisions, FIOH started a big research and development project to network provincial OHS providers and explain the possibilities to build up provincial OHS unit. Other FIOH's activities are information steering, consultation, education and publication. The aim is to build up bigger units and thus reduce the number of municipal units. The number of municipal OHS units has decreased from 242 in 2004 to 192 in 2007. Median municipal OHS unit size in public-service OHS companies was almost 11 000 clients, as compared to the traditional municipal OHS units having 1500 clients at the end of 2007.

The aim is to give equal services, like in OHS, for those in work-life marginal. To produce services, like in OHS, for those who are unemployed or without permanent work, FIOH has started a pilot project in 2008. These services are now (2008) piloted as embedded into municipal OHS.

The reasons for regional variation in occupational disease diagnostic practices and developmental challenges have been explored. This has activated the harmonisation of diagnostics nationally and implementation of evidence-based update to the diagnostics. The aim will be harmonised diagnostic practices of occupational diseases all over Finland.

The Cochrane review group has produced, from 2006 to 2008, 7 reviews and 1 good practise. Evidenced-based data is implemented through publication and education.

FIOH arranges qualification and supplemental education to OHS professionals and experts. FIOH is harmonising its qualification education and developing multidisciplinary education. A study on the assessment of effectiveness of education is ongoing. The aim is for more qualified personnel in OHS and the effectiveness for better quality in the OHS activities.

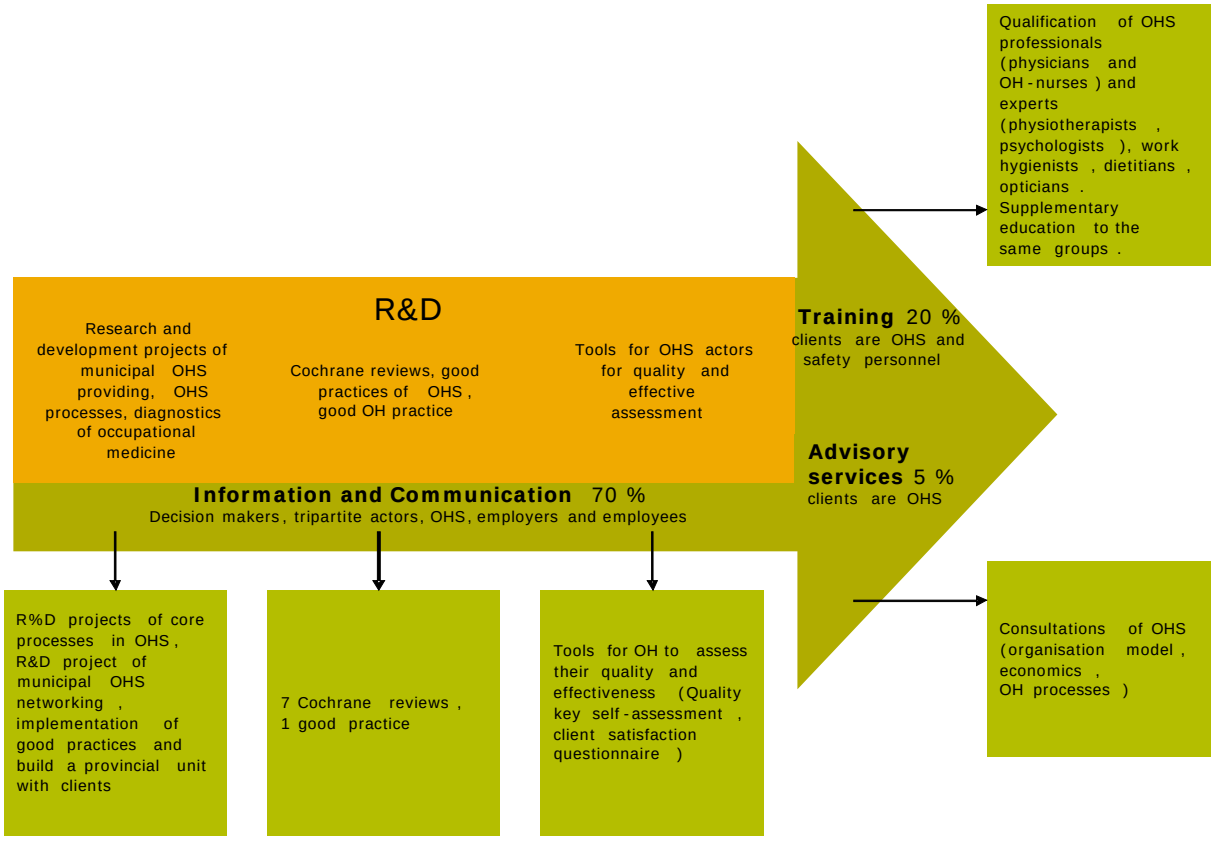


Figure 3.4.4 Allocation (%) of resources and outputs according to mode of operation.

Focal achievement

<u>Equal and standardised occupational health services (OHS) in municipalities</u>

Client need: In effective OHS, services are comprehensive and homogeneous for every client and updated OHS system knowledge is readily available. Municipal OHS production has had difficulties for years, especially in the countryside, mainly due to the lack of resources and competence. The PARAS act for the years 2007–2012 requires municipalities to form bigger health and social care units in order to improve their services, and this applies to OHS. The Ministry of Social Affairs and Health's Advisory Board of Occupational Health has determined that one aim in the development of OHS during 2006-2011 is improvement of municipal OHS. Every municipal OHS unit is involved with this change. The aim in the development is towards bigger, well-resourced and more independent units. There are different options for building up bigger units, but the main structure is a public-service company. Most units need expert advice, because decisions and solutions they have to make are significant and concern many different expertise areas. Knowledge of the OHS system should be more up to date to develop the municipal OHS system.

Solutions: FIOH facilitates the development of the municipal OHS system. FIOH has increased its resources for this task for the years 2006–2012.

OHS knowledge update: A knowledge update shall be used as a basis for OHS development. The ‘OHS in Finland’ survey in 2007 has produced information about the coverage, clients, structure, personnel and activities in OHS. This is the sixth survey carried out every third or fourth year. FIOH has fastened data collections. Results from the latest survey were in use 3 months after the data collection deadline. Effective utilisation of regional data, however, is still a challenge.

Research projects: The focus of OHS research in 2006-2012 is in the municipal sector. In 2008, FIOH began a big municipal OHS research and development project, in which the aim is to network provincial OHS units and provide equivalent OHS services in all of its locations. FIOH also explains the possibilities to build up a provincial OHS unit that is a big municipal unit in FIOH's context. This is a pilot project that will eventually be implemented nationally. FIOH plans the content of this project in close cooperation with local primary and tertiary health care, municipal decision-makers and local municipal OHS providers.

Consulting municipal OHS: FIOH utilises its multidisciplinary OHS team, survey data and research project experience in its consultation services for the municipal OHS units. In this, the change organization model and economy have been the main consulting areas. FIOH has acted as a consultant in seven OHS units altogether in 53 municipalities in 2008.

Information steering: Information steering is focused on macro-, meso- and micro-levels. At the national level, it is directed at decision-makers, tripartite and other interest groups and the OHS units in question. Activities include seminars and meetings, from the state level to local OHS units. Special national network seminars have been arranged twice a year since 2005, in cooperation with the Ministry of Social Affairs and Health. The main target group of these network seminars has been decision-makers and municipal OHS personnel (micro-level). The seminars are a good means for disseminating information on the different topics in this field and they proved to be an important forum for discussing the ongoing change. Altogether, 160 experts with their change projects have participated. In addition, ten local seminars have been arranged in 2008. Local seminars have been tailor-made according to client needs.

Implementation

FIOH activities are used at different levels, facilitating municipal OHS problem-solving with decision makers and in close cooperation with the field. Knowledge from surveys and research are spread via publications, presentations, web sites, education (qualification and supplementary) and consultations.

FIOH has played an active role in developing legislation and the reimbursement system. The Public Health Care Act was amended in 2007, and the amendment concerned arranging OHS in municipalities.

Important in this change has been to clarify the OHS status and role in health care and municipal systems. FIOH's research projects of content and structure of OHS complete each other, thus making FIOH's action more effective.

The aim has been to decrease the number of OHS units and increase OHS unit size. From 2004 to 2007, the number of municipal OHS units has decreased by 54 (from 246 to 192). At the end of 2007, public-service OHS companies already served 25% of municipal OHS clients. From FIOH's "OHS 2007 survey", FIOH knows these new OHS companies are, on the average, much bigger units than the traditional ones and have also better resources, which will help these OHS units in providing higher-quality services according to the "Good OHS Practice".

Improving the content quality in occupational health services (OHS)

Client need: To be effective, OHS activities should be produced according to the good occupational health practices. Just as with the OHS system in general, there is currently a great variation in the quality of the activities inside and between the different models of OHS. At the moment, only a part of OHS units provide services in which the quality is high enough according to the "Good OHS Practice". The aim is for every OHS to produce their services according to the "Good OHS Practice" guidelines. FIOH's role has been to develop content for the "Good OHS Practice" and implement them into OHS through training and education, information dissemination and services.

Solutions: Updating Good Occupational Health Service Practice (GOHPS). The guidelines of Good Occupational Health Practices was updated in 2007 in line with the renewal of the Occupational Health Care Act in 2002. The new practices were prepared at by a tripartite expert consensus as to what constitutes the minimum level of OHS activities. The book is a framework for the core processes in OHS.

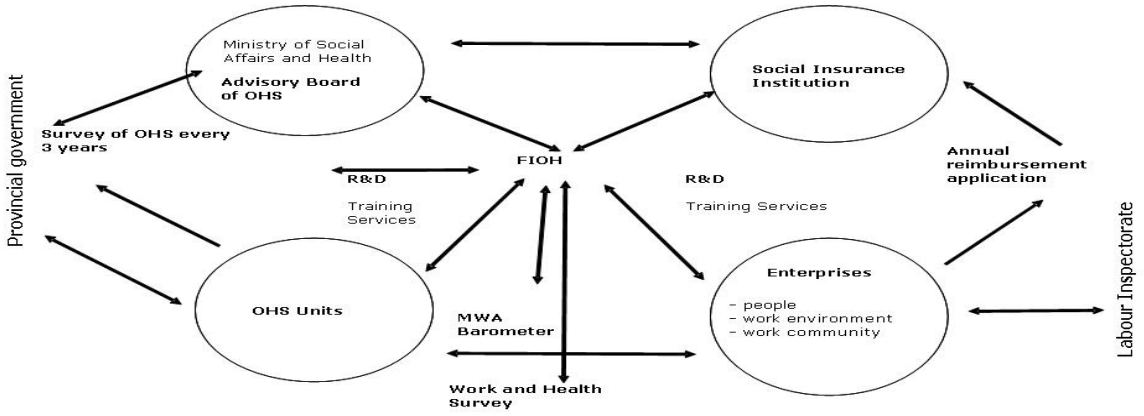
Research on effective activities in occupational health: In 2005, FIOH established a major research project entitled Sateenkaari (Rainbow) in order to connect research on OHS content and find an effective way to produce OHS activities. Ten sub-projects focus on core OHS processes, and four of them are now in their reporting phase. The results show how core processes act in OHS units and determine the main needs for development. Action model and good practices have been created for information guiding, advising and mentoring and planning of OHS content in companies. More good practices will be created as a result of finishing other subprojects on OHS core processes like health surveillance, action planning of the OHS unit's own work, work society. Many OHS units are involved in these sub-projects, and the planning of new projects is carried out in close cooperation with OHS professionals in the field.

Production of evidence-based OHS knowledge: FIOH's Cochrane group produced 7 systematic literature reviews of OH 2006-2008. Systematic literature reviews have been used in preparation of practice guidelines and in our training and education of OHS.

Implementation: It has been found that the evidence is transferred into good practices and practical guidelines and implemented through publication, education (qualification and supplementary), information steering, consultation and web pages.

FIOH has good practices for OHS core processes that will be updated in the Sateenkaari project. Finding scientifically and economically effective contents and action models of OHS core processes is still a challenge. Continuous quality improvement has been planned to become obligatory also in OHS units daily practice, not only as a paragraph in the OHS Act.

Follow-up of the Finnish OHS-system



Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: ++

R&D activities in this strategic goal consisted of 1) FIOH's triannual, industry- or topic-based surveys, 2) register data and 3) R&D projects and interventions for developing occupational health services (OHS). Thus, the databases provide solid information for authorities and other decision makers.

Efficiency of implementation process/methods applied and potential impact of produced outputs: ++

Information and communications to authorities and other decision makers has successfully reached the target population. The labour inspection authorities and OHS providers have utilised surveys, register data and the extranet/internet data base. *Working conditions in Finland* has not so far been used as widely as planned, but for the second half of this strategy period, marketing will be effective among the non-users.

Use of partnerships and cooperation improving effectiveness: +++

Co-operation at all levels (macro-, meso- and micro-) of this strategic goal is the firm basis for the effectiveness. FIOH has a long tradition of cooperation with the ministries, especially with the Ministry of Social Affairs and Health, Ministry of Education and Ministry of Employment and Economy, as well as with the social partners and members of parliament. Participation of FIOH´s experts in different committees and working groups has been extensive: e.g. during 2008, there has been a FIOH expert in almost 500 working groups. Gathered information and proposals have been used in many national programs.

Achieved impact: ++

The objectives of the three programmes of this strategic goal have been well met. The information produced by FIOH will be further utilised by authorities and other decision makers for promoting OS&H because of FIOH's improved provision channels, methods and networks for information and communication.

3.5 Smoothly flowing work processes, safe and easy to use working methods and tools

Overview

Aimed impact

Actual improvements in work, work processes and methods are often a critical precondition to achieve permanent improvements in workers' health, safety and performance. In this strategic goal, the three strategic programmes were planned on the following three main arguments. First, in order to be able to achieve changes in work, proactive influence is needed already at the level of the design of the work, work processes and methods. The emphasis should be

switched from the repairing of ergonomic problems to their prevention. Second, macro-ergonomical actions are necessary to compensate for the negative trends in working conditions. Ergonomic shift systems are needed to compensate for the negative effects of the new 24/7-society. Finally, increasing road traffic and the related occupational health risks need changes in professional drivers' work and their occupational health services. New EU legislation on the training of truck drivers gives new possibilities for health promotion and education on coping with the OSH risks of professional driving.

The general aims of the strategic goal are:

- designers will start considering the human aspects of work already in the early stage of the design process
- ergonomic and healthy working hours in forest industry, transportation, health care, and private service become popular
- working conditions and occupational health services in professional road safety improve

Main specific impact processes

Improvements in OH&S were planned by using the following impact processes:

- improving the early design process of the working places. This is possible by including criteria of health and well-being in the design specifications and by giving designers the knowledge and access to the required data and design tools (e.g. collaborative methods)
- designing and studying new "healthy" working hour models and promoting their use by co-operation with social partners, extensive dissemination of information and ad-hoc consulting of the companies interested in changes in working hours
- improvement of the occupational health care and working condition of the professional drivers by making pilot and intervention studies, consultations and guidance books and booklets in co-operative networks with the social partners, truck companies, occupational health specialists, authorities and the third sector

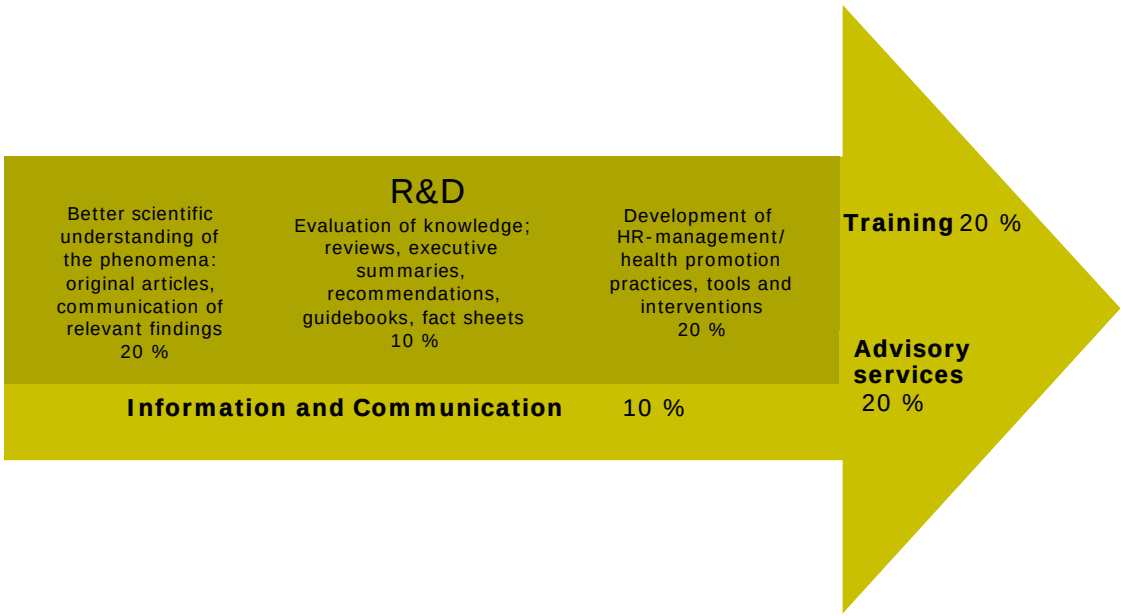


Fig 3.5.1 Allocation of resources according to the mode of operation.

Programmes

1. Promoting human-centred design

The aimed impact of the programme takes place in the design of the working environment, productions systems, equipment and products used in workplaces by considering the human aspects already from the early stage in the design process. It requires that a) criteria of health and well-being are in design specifications, and b) designers know and have access to the required data and design tools (e.g. collaborative methods). Good design is the most proactive way to increase health and safety by preventing the musculoskeletal disorders, human errors and occupational accidents.

The scientific epidemiological knowledge about risk factors of musculoskeletal disorders forms the basis for design information. The international ergonomic standards are also used as design guidelines whenever they are applicable. In addition, our scientific research increases knowledge about new ergonomic solutions and good practices for design.

Processes used to improve the situations include all modes of operation of FIOH. The aim is to get human-centred design used in Finland on a broader scale. Two aspects that should be improved: a) FIOH must offer calculation models for profitability of the consideration of human aspects, and b) FIOH's network and cooperation with designers should be strengthened.

The core goal is that designers are motivated to use and look for human data. In addition, OH&S personnel should be able to participate in the early design processes at workplaces. Therefore, new design participation methods for different occupations are developed in R&D projects, and the results will also be reported scientifically. (See focal achievement "Incorporation of human considerations in the design of production lines - development of processes, practices and tools").

The Internet publications, software tools, data banks and services are compiled for designers and OH&S personnel. For example, four data banks on good ergonomic solutions and good practices are available (accessible workplace, kitchen work, commercial enterprises, and agriculture), and four new databanks are under publication (repetitive work, manufactoring work, restaurant work, and collection of general design data). The Ergonomic guides, Ergonomics of kitchen work and Good school, have been published as traditional books and the Visual usability guide as an internet publication.

The tailored services of FIOH offer the clients the ability to exploit the ergonomic expertise of FIOH in their own product design processes (see also focal product "Promotion of ergonomics in product development" in 4.2). The product concept is to attach ergonomics to a product development process as a particular set of ergonomic methods and procedures. Services are also given for the workplace design processes (e.g. shops, laboratories, assembly lines, X-ray analysing workstations, money calculating workstations), and the testing and developing of safety and ergonomic characteristics of personal protective equipment (see focal achievement "Development of protective clothing against high temperature liquid splashes").

Training courses for good design have been arranged for designers and OH&S personnel in different parts of Finland. Also, company-tailored courses have been arranged on client demand.

Measuring instruments: Evaluation of the programme will be made by using the interviews and questionnaires. The design network will be interviewed about the possible increase of use in human-centred design. The design professionals will be asked with a questionnaire if new methods and knowledge of design are in use. In addition, some numbers will be followed: 1) the number of visitors in FIOH's net pages including design data and data banks, 2) the number of expert services, 3) the number of sold guides and books and 4) the number of participants in the design courses.

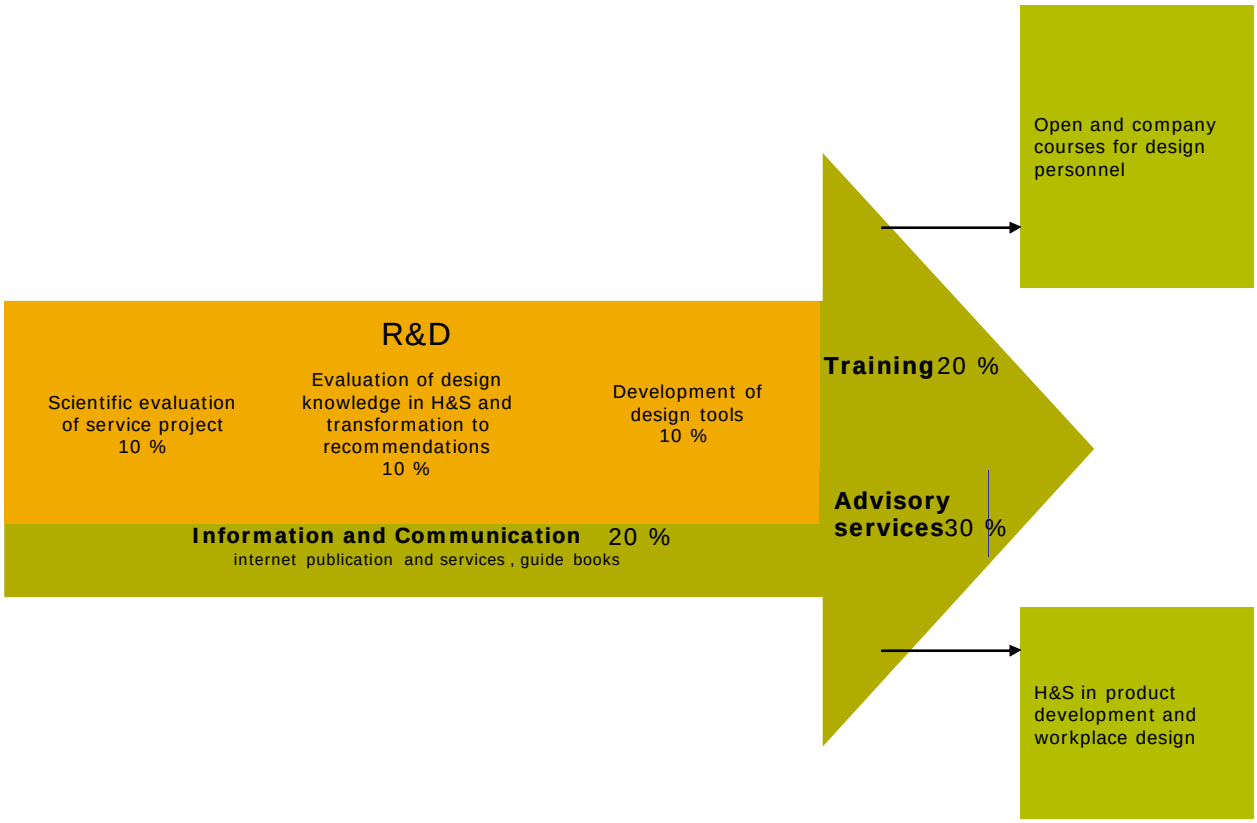


Figure 3.5.2 Allocation (%) of resources and outputs according to mode of operation in programme *Promoting human-centred design.*

Focal achievements

<u>Incorporation of human considerations in the design of production lines - development of processes, practices and tools</u>

The investment design process and associated design practices and tools were developed in the sawmill industry. The aim was to incorporate ergonomics and work environment considerations into the entire investment design process and to promote the involvement of personnel groups in designing. The outcome of the project was compiled into an extranet application 'Well-being through good design', with the purpose of spreading the use of the principles and tools within organizations.

The development project involved the representatives of both a Finnish sawmill company and the two manufacturers of the sawmill machinery. Together with the researchers of FIOH, they analysed and improved design practices through a series of workshops and group sessions.

As the result, the investment process was described, and in all stages of design the possible ways to consider human work activity and work environment were outlined. Also, design principles, descriptions of legislative background, work environment factor specifications, guidelines for workplace design, and checklists for various purposes were created. They are aimed e.g. for determining manning at the machinery, design of work tasks, evaluation of workplaces, planning of training, risk assessment and, for facilitating project meetings and negotiations with the manufacturers.

In the feedback, the designers expressed that it is particularly important to have all needed information in one source, and to be ensured that it is commonly accepted and up-to-date. The extranet now has five user companies in the wood industry, altogether 18 sawmills and several other wood processing mills in Finland (and tens of production units globally). It is applicable in a range of other industrial organizations, too, and one company in the chemical industry has also taken it into use. The extranet is financed by contract and an annual fee.

The extranet service has been marketed in the internet pages of FIOH, articles in journals and in fairs and seminars. It has also been presented in several scientific symposia or conferences. The extranet is a new form to transmit health and safety data to the design process from its beginning, and to the persons who make the technical solutions, which, in turn, form the work activity and work environment of humans.

http://www.ttl.fi/Internet/Suomi/Palvelut/Extranet-palvelut/Hyvinvointia+hyvalla+suunnittelulla.htm

Launis M, Ala-Laurinaho A. 2006. Investment handbook for facilitating collaborative designing of production lines. 16th World Congress on Ergonomics, International Ergonomics Association IEA; 2006 July 10-14; Maastricht, NL.

Development of protective clothing against high temperature liquid splashes

High temperature chemical liquids (800-900 °C) have caused injuries and hazard situations in the recovery boilers in pulp manufacturing mills. Accidents typically occur when the employees open blockages in recovery boiler areas. Normal flame retardant fabrics are ineffective in protecting against high temperature alkaline chemical splashes. To develop more protective and functional clothing and other personal protective equipment (PPE), this project was carried out jointly with the Finnish Recovery Boiler Committee, on partial funding from the Finnish Work Environment Fund, the Finnish pulp industries (Stora Enso, Botnia and UPM), Filtercon Oy and Lindström Oy.

The first phase of the project included an analysis of the work demands and working conditions, as well as types of injuries, criticalities, causes of accidents and types of contact events. Interviews (61 employees) were conducted in seven different mills in Finland. During the second phase, the temperature and air humidity values in recovery boiler areas were measured in the factories. In the third phase, samples of currently available materials and PPE appropriate for protection against high temperature liquid splashes were selected from the market, and the protection level of them was tested in the laboratory with the method which was developed during the project. A total of 26 various materials and material combinations and 21 different types of PPEs for head- and hand-area protection was tested. The highest level of protection was measured for Teflon-finished 50/30/17/3% FR CV/WO/PES/R-stat fabric with 55/45% FR PES/CO knitted fabric. For many tested fabrics, the chemical did not run off, but penetrated the materials causing a rapid and high temperature increase. In the fourth phase, prototypes for protective clothing and gear, which meet the requirements of working conditions and demands set by the recovery boilers workers for safety and ergonomics, were designed.

Protection against hot splashes in the face, neck and head area were the most often presented demands for the design. Within the project, protective clothing, underwear, and special protective gear were designed. This 3-layer combination is best for protection, but more likely to produce heat stress for the end users. For this reason, it is recommended that this combination with the gear be used only in dangerous situations, such as when employees are opening jams in a recovery boiler.

However, protective clothing and other personal protective equipment cannot alone guarantee the safety of recovery boiler workers. Personal protective equipment shall be used, if the risks cannot be sufficiently limited by technical means. To improve correct use of personal protective equipment and protective clothing, a guidebook on risk assessment and selection and correct use of personal protective equipment has been provided to the end users.

After finishing the project, Lindström Oy has begun serial manufacturing of the designed garments. The Finnish Recovery Boiler Committee has translated the guidebook into English for distribution for workers in recovery boilers in others countries.

Mäkinen H, Nieminen K, Mäki S, Siiskonen S, Development of a test method against hot alkaline chemical splashes. Int J Occup Safety Ergon (JOSE) 2008;14(1);19-28.

Mäki S, Koskinen H, Mäkinen H, Protective clothing and other personal protective equipment (PPE) against high temperature liquid splashes for recovery boiler workers. In: Mäki S (ed.). Seminar report on the 8 th European Seminar on Personal Protective Equipment 8th European; 27-29 March 2007 in Saariselkä, Lapland, Finland. Helsinki: Finnish Institute of Occupational Health, 2007: 145-6. (Work Environment Report Series, 27).

2. Human and productive working hours

Aimed impact

The general aim is to increase the proportion of employees whose working hours support both health and productivity at work. The main target groups of the programme include the forest industry, transportation, health care and private service sectors.

In the forest industry, FIOH aims at advancing the use of shift systems that are based on rapidly forward rotating shifts. FIOH has been developing these shift systems to support especially the health and well-being of ageing shift workers. During the period 2006-2007, the rapidly rotating shift systems were tested in 18 paper mills, and 6 of them have already decided to adopt them. In addition, there have been negotiations on these shift systems in 21 other paper mills.

In the health care sector, FIOH promotes ergonomic shift planning in irregular shift systems. As a result of FIOH's research and development, the City of Helsinki Health Centre has adopted the concept of ergonomic shift planning as a means of promoting well-being at work. At the moment, FIOH is developing well-functioning work hour models for the whole nursing sector in close collaboration with the involved labour market organizations.

Within the private service sector, the focus is on flexible working hour solutions that support well-being and work-home balance. The impact of FIOH's effort will be evaluated with the number of companies employing individually flexible working hour practices.

In the transportation sector, FIOH's goal is to reduce driver sleepiness by introducing the concept of fatigue management. The aim is to commit both the employees and employers to the use of working hour solutions and other means that support alertness while driving. The increase in the number of large-size companies where the means of fatigue management are in use will serve as an indicator of FIOH's success.

Aimed impact process

To achieve these aims, FIOH has utilised all operations mentioned in the figure 3.5.3. The starting point has been the production of high-quality research knowledge in response to topical working hour challenges. FIOH's research encompasses epidemiological studies on the health impacts of shift work and individually flexible working hours, experimental studies on the effects of sleep restriction and fatigue countermeasures, and intervention studies on healthy working hour solutions. These studies have been published in high-quality scientific journals with referee practise.

Having expert status in the field of working hour research, FIOH has been able to create sector- and workplace-tailored development, training and consultation projects through which relevant research knowledge has been implemented into practice. In these projects, FIOH has been collaborating mostly with the representatives of the labour market and work organizations and occupational health care units. Most of these projects have been participatory in nature and some of them have produced working hour models that have been adopted for use in other work organizations as well.

Popular books, booklets, and guidebooks and media visibility have been other avenues for implementing research knowledge into practice. The main purpose of the dissemination of information has been to raise public awareness of healthy and productive working hour solutions.

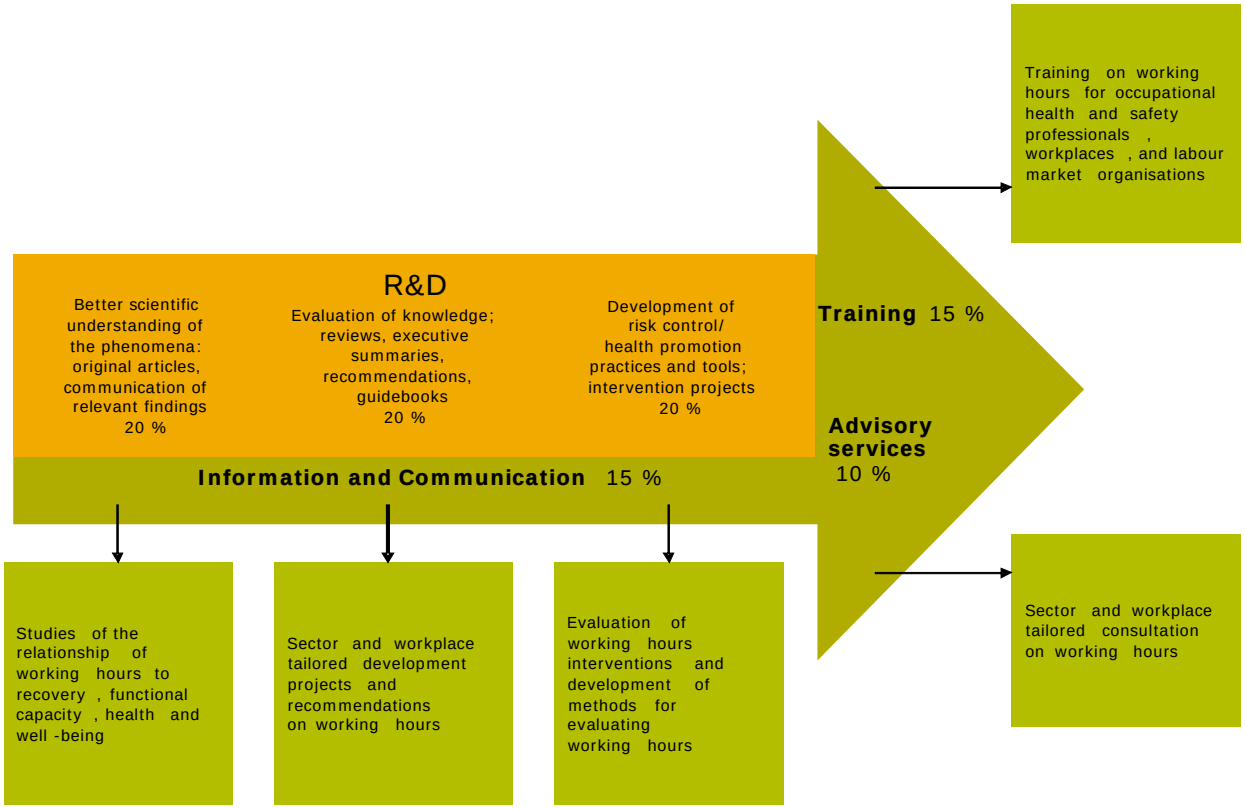


Figure 3.5.3 Allocation of resources according to the mode of operation.

Focal achievements

Ergonomic shift planning in the nursing sector

In the health care sector, FIOH has been introducing and implementing the concept of ergonomic shift planning. In practice, the concept means the replacement of the most loading shift combinations, such as a late evening shift followed by an early morning shift, with less loading ones. FIOH's work has been based on our research findings on the relationship of irregular work hours with sleep-wake rhythm[1]. The implementation process has included systematic sector-tailored training and collaborative development projects. In one of these projects, the results were so positive that the City of Helsinki adopted the concept of ergonomic shift planning as a means of promoting well-being at work[2] in their health centres.

At the moment, the concept is in test or permanent use in several home care units and hospitals of Helsinki city. The implementation of the concept into the whole nursing sector of Finland is also progressing. FIOH has been able to create a forum where all labour market organizations of the nursing sector are collaborating to innovate and identify healthy and well-functioning working hour solutions. In addition, FIOH has had an extensive training programme on shift work and well-being in collaboration with the Union of Health and Social Care Professionals (Tehy), and FIOH's training material is accessible to all members of Tehy at the union web site.

[1]*Sallinen M, Härmä M, Mutanen P, Ranta R, Müller K.* Sleep-wake rhythm in an irregular shift system. Journal of Sleep Research, 2003, 12, 103-112.

[2]*Paukkonen M, Pohjonen T, Hakola T, Lindholm H, Sistonen H & Simola R.* Healthy Working Hours: report of the research and development project. Helsingin kaupungin terveyskeskuksen raportteja 2007:7, 45 p. ISBN 978-952-223-191-8, ISSN 1459-9112

http://www.tsr.fi/files/TietokantaTutkittu/2005/105273Loppuraportti%20_eng.pdf

Rapidly forward rotating shift system in the paper industry

Following a breakthrough in the metal industry and an extensive dissemination of information on working hours and health, the implementation of the so-called rapidly forward rotating shift system (RFRSS) has fared well in the paper industry as well. An example of this shift system is a rota including one morning shift, evening shift and night shift in a row, in this order, followed by two days off. This solution is based on our research findings that especially ageing workers benefit from this sort of shift schedules[1, 2]. Following a change in the collective agreement of the paper industry that made it possible to consider the RFRSS and a before-after evaluation of the new shift system by FIOH in two paper mills, there have been a number of paper mills testing this solution. During the period 2006-2007, this shift system had been tested in 18 production units, and 6 of them have already decided to adopt it. In addition, there have been negotiations on the shift system in 21 other production units.

In addition to the paper industry, FIOH has been able to contribute to the spread of the RFRSS to other industries as well. An example of this is in energy production where several production plants in the Helsinki area have switched from their traditional shift system to the RFRSS.

[1]*Härmä M., Hakola T., Kandolin I., Sallinen M., Virkkala J. and Bonnefond A. A controlled intervention study of the effects of a very rapidly forward rotating shift system on sleep-wakefulness and well-being among young and elderly shift workers. Int J Psychophysiology 2006:59;70-79.*

[2]*Viitasalo K., Kuosma E., Laitinen J. and Härmä M. Effects of shift rotation and the flexibility of a shift system on daytime alertness and cardiovascular risk factors. Scand J Work Environ Health 2008;34(3):198–205.*

3. Safe and healthy professional drivers

Aimed impact

The general aim is to improve professional drivers' health and safety as well as their productivity at work. The professional drivers' ability to work is being looked after with the help of measures implemented by developing ergonomics and logistics and clarifying lines of responsibility in the entire logistics chain, particularly at loading and off-loading sites. In the setting of objectives for and the implementation of projects for the working environment and work processes, improved consideration is being paid to people-oriented planning. The development project on working hours has been implemented for road haulage. Less detrimental working hour arrangements are becoming more commonplace.

Developing the scope and content of occupational health and safety services for road transport, new operating methods are piloting both with large- and small-scale entrepreneurs. The goal is to increase the knowledge about understanding of how to promote the health and safety of the professional driver, an optimal set of screening tests and best practices to implement in general for professional drivers' occupational health care units to all those working in the sector (transport companies, employees, employer associations, policymakers in this domain).

Promoting a healthy diet and exercise for professional drivers amongst workers in the heavy transport sector, FIOH tailor-makes fitness plans for drivers.

Developing the assessment of driving ability and aptitude testing for professional drivers, FIOH is developing methods which enable reliable and nationally consistent holistic assessments of work and driving ability as well as early detection of an unsatisfactory physical condition for professional drivers.

Aimed impact process

The starting point has been to implement research knowledge in response to current health risks and the national profile of working conditions of the professional drivers. By the research and development (R&D) projects, the client based co-operative network has work out well in all levels (employers, large scale as well as SME and self-employed and employees and trade unions, co-operation with the health care units and public authorities).

Having expert status in the field of traffic medicine and OSH in the road transport sector, FIOH has been able to create sector-tailored development, training and consultation projects through which relevant research knowledge has been implemented into practice. In these projects, FIOH has been collaborating mostly with the representatives of transport sector companies, the labour market and work organizations and occupational health care units.

In addition to the guidebook, FIOH will prepare booklets and utilise media visibility for implementing research knowledge into practice. The main purpose of the dissemination of information has been to raise the awareness of the health and safety of professional drivers among all those working in the sector, as well as the authorities and policymakers in the road transport sector.

During 2007–2008, the emphasis of FIOH's activities was on developing new solutions and implementing them together with partner organizations. During 2009–2010, FIOH will be

concentrating on the implementation of the developed solutions and on producing information required for new initiatives.

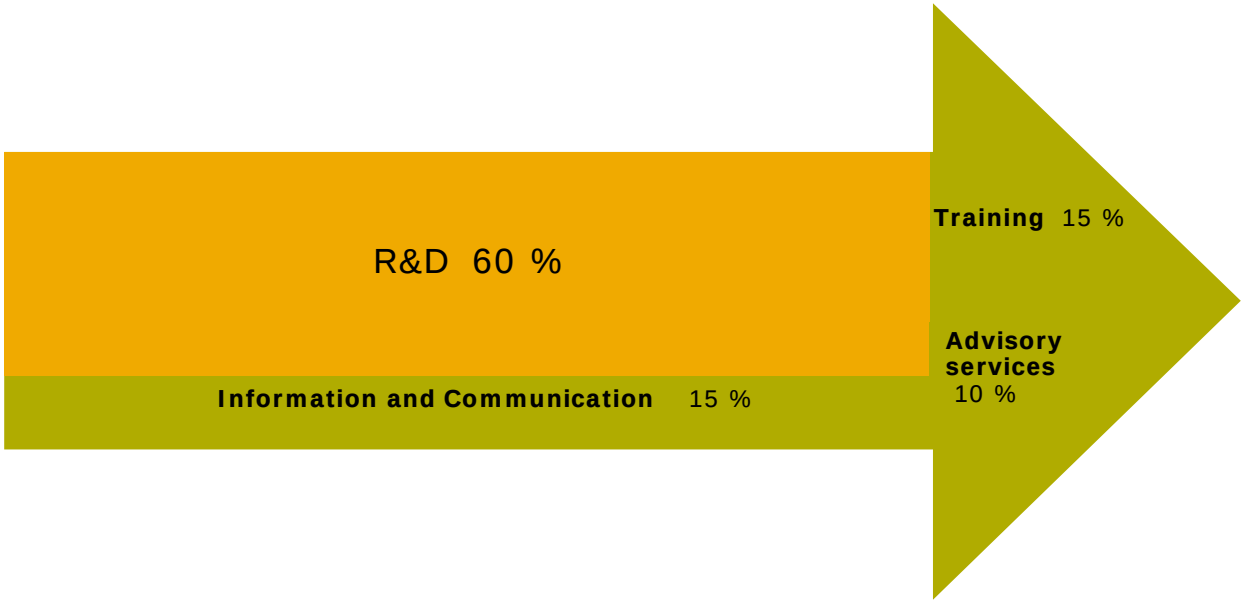


Figure 3.5.4 Allocation of resources according to the mode of operation.

Focal achievement

Safe and healthy professional drivers

Road traffic exposes the professional drivers to several occupational risks. The prevalence of obesity and e.g. metabolic syndrome are high among the drivers. Health problems and fatigue are risk factors for traffic safety and safety at work. Most transport companies in Finland are small (90 % of truck companies have less than 10 employees), making the access to OSH services problematic.

To improve the health and safety of the professional drivers, FIOH has initiated a wide range of actions related to the improvement of the occupational health care and activation of the health promotion possibilities of Finnish professional drivers. First, FIOH prepared a guide to professional drivers' occupational health care units. By research and development projects and cooperation with the health care units, FIOH has created an optimal set of screening tests and practices for the professional drivers' occupational health care. In addition to the guidebook, FIOH has organized educational meetings with the occupational health care units and prepared booklets for practice.

FIOH made a special effort to improve the scope and quality of the occupational health and safety services for small and medium-size companies (SME), as well as for self-employed workers in the transport sector. By means of a development project in cooperation with the entrepreneurs of South-West Finland, a previously developed OSH model for SMEs (SYTY2000) will be tailor-made to the SMEs of the transport sector in 2008–2011. The project is funded by the Ministry of Social Affairs and Health.

Based on FIOH's research findings on various fatigue countermeasures, including optimal sleep-wake rhythm, rest pauses, and stimulating work tasks, FIOH is working on a guidebook on various means to promote professional driver alertness at the wheel. The focus is on fatigue management and company-based practises in fatigue countermeasures. The involved labour market organizations serve as commentators for the book. In 2009, the new guidebook will be introduced to the actors in the road transport sector in an invitation seminar, which will be followed by training events targeted at both employers and employees. In addition, the material will be included into professional driver education programmes that are obligatory in the future for all drivers in the road transport sector.

To be used in the occupational health care, FIOH has developed a short group counselling model for the dietary habits during working hours. The ultimate aim is to support the prevention of the common type 2 diabetes among the professional drivers. Funded by the Academy of Finland, a pilot study was carried out to create the model based on the counselling session among 11 professional drivers. Videoconferencing is a way to provide specialists services to remote areas, while there are no clinical nutritionists working in occupational health care in Northern Finland.

To promote healthy dietary habits of professional drivers and by opening up a possibility to choose healthy meals and snacks to gather information for the best practises, FIOH produces leaflets and an audio book for the professional drivers, in addition to the other material for vocational education and media. This project is funded by a three-year project of the European Social Fund and developed in collaboration with professional drivers and their organizations, employers, service station restaurants and the occupational health care personnel. The project occupies 14 cooperative affiliates and a great amount of different actors. Surveys will be carried out both in the initial stage of the project as well as after the initiated countermeasures.

EU road freight transport sector: Work and employment conditions
http://www.eurofound.eu.int/publications/htmlfiles/ef03102.htm

Paula Kärmeniemi, Jaana Laitinen, Jari Latvala, Seppo Olkkonen, Markku Saino and Aira Ylä-Outinen. Safe and healthy professional drivers - guide for professional drivers' occupational health care units. Manuscript, will be published in 2008 by The Finnish Institute of Occupational Health (FIOH)

[1]*Sallinen M, Holm A, Hiltunen J, Hirvonen K, Härmä M, Koskelo J, Letonsaari M, Luukkonen R, Virkkala J, Müller K.* Recovery of cognitive performance from sleep debt: Do a short rest pause and a single recovery night help? Chronobiology International, 2008, 25, 279-296.

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: ++

- High scientific output in the area of working hour research: epidemiological studies on the health effects and control over working hours, experimental research and intervention studies on the use of new working hour models

- High-quality R&D-projects and client-based client reports and publications on the promotion of human-centred design and improvement of safety and health among professional drivers

Efficiency of implementation process/methods applied: ++

- Efficient implementation of the results and innovation processes based on the interactive active-use R&D, dissemination of information, training and service in each of the three strategic programmes

Use of partnerships and cooperation in improving effectiveness: ++

- High cooperation with companies (all), developers and designers (5.1), , social partners (5.2 and 5.3), ministries (5.1 and 5.3), occupational health care (5.2 and 5.3), occupational safety executives (5.1) and the third sector (5.3)
- Good national (Finnish Sleep and Health Consortium) and international scientific networking in the area of working hour research

Potential impact of produced outputs: ++

- High expectations in the use of new working hour models, policies in the use of human-centred design and partial improvement of the occupational health care system and health promotion of professional drivers in Finland.

Achieved impact: +

- Satisfactory achievement on the impact related to the use of new working hour models in forest and metal industry, health care, and private service sectors
- Good pilot evidence on the benefits of human-centred design in several projects such as laboratory work, office environment, policy work, construction work and in the promotion of accessible working places.
- Good progress in the development of the occupational health care system and health promotion of professional drivers.

3.6 Solutions for increasing participation in working life

Overview

Aimed impact

The Finnish Government aims at extending people's participation in working life by 2-3 years. There are a number of structural factors that make attaining this goal in such a short time so challenging.

The oldest age groups in the workforce consist of the large post-war age cohort, and chronic illnesses are common among them. The poor educational background of this group undermines their employment opportunities, as demand for skills is constantly growing. Employers and employees often have reservations about older people staying on at work, and fixed-term and part-time employment is widespread, reducing people's ability to plan their lives. The new pension act gives economic incentives to continue working after the age of 63 until 68 years old. Also since 2007, there has been a new possibility to use part-time sick-leave, which enables returning to work after a long sick-leave period.

The critical stages in the continuity of a person's work career are the transitions between work and other stages of life: from school to work, from one occupation to another, from being unemployed to working again, from sick-leave back to work, from disability through rehabilitation to other work and so forth. In order to boost workforce participation, working arrangements need to be more flexible on an individual level to suit an employee's life situation or health.

This report refers to three main intervention topics in this field; transition from school to first employment, from working life to retirement, from work to sick-leave and back, because of common causes of diseases (work-related musculoskeletal and psychosocial diseases, and occupational allergy). The innovation circle from basic research to guidelines and practical implementation and dissemination was effectively applied in each of these topics.

Special reports on action plans (themes) for ageing, participation in working life and musculoskeletal diseases prevention are delivered separately.

Main impact processes

Together with FIOH's partners, FIOH developed new solution models to increase participation in working life, and to strive to prevent negative attitudes towards working life. Bearing in mind the needs of different aged people, FIOH studies approaches that allow for early intervention, more flexible working hours, adapting work to the resources of the person doing it, and ways of reinforcing the positive effects of work on improving life management and well-being.

FIOH is also developing solutions that help reduce sick leaves and disability due to chronic illnesses and impairments. Its focus in this is particularly on mental health problems and musculoskeletal disorders. FIOH needs more knowledge about work-related causes and prevention of the largest causes of disability and early retirement: musculoskeletal disorders and depression and other mental health problems.

FIOH develops operating models that help balance work and other aspects of life, especially in situations when people need to care for their children or elderly relatives, or they want to study alongside work.

Summary statistics

The planned resources in 2006–2008 for this strategic goal have been around 30–40 person years.

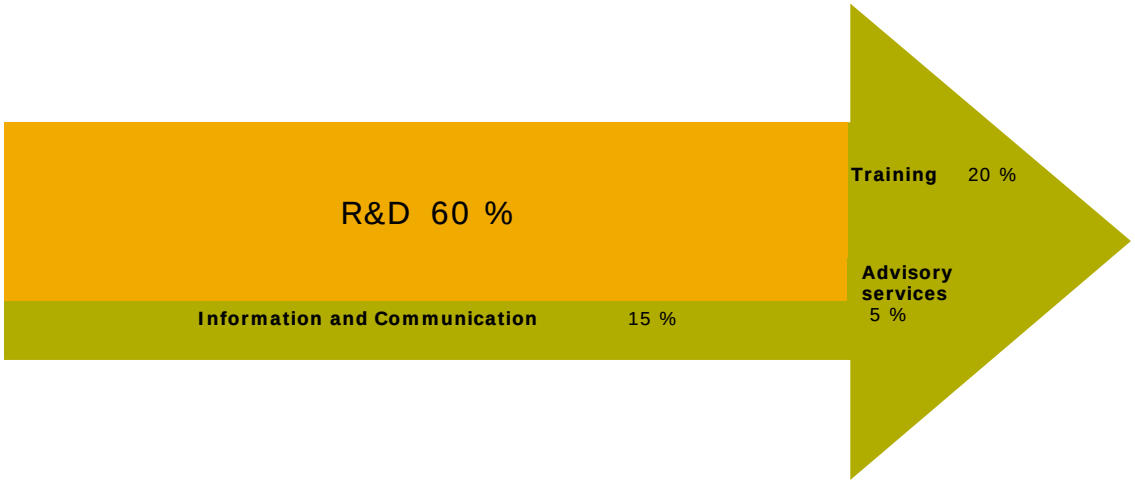


Figure 3.6.1 Allocation of resources according to the mode of operation.

Programmes

1. Ensuring work career in different phases of life

Aimed impact

The aim is that people participate more in working life during different phases of their life. For young people this means quicker integration into working life after studies and better socialisation to organizations in better quality jobs. For work aged people FIOH's aim means better possibilities for participating in working life during various phases of the working life course in rapidly changing organizations. This also means that employees have better possibilities to pursue their goals at work, and organizations more often take into account the varying needs of employees. For employees this means by the same token better information and skills for career and age management, better motivation to participate in working life, and better well-being in working life.

Aimed impact process

The main strategy is to develop research-based products, which enhance participation in working life during the life course of employees, and to disseminate these products country wide in educational institutions and work organizations. This main strategy comprises three main impact processes:

1. For enhancing young people's integration into working life and socialisation to organizations, FIOH has developed group methods for promoting career choice, employment and its quality. FIOH trains teachers and trainers of employment offices country wide to become trainers of the group methods in schools. The beneficial impacts of the methods on career choice, employment, its quality and mental health have been verified in randomly assigned controlled field (RCT) studies.
2. For promoting career management, work retention and mental health among employees in changing organizations, FIOH has developed a group method where trainers come from personnel management and occupational health service. The method is designed to increase preparedness for career management among employees in organizations which undergo structural changes. FIOH trains employees to become trainers of the method in their respective organizations or client organizations country wide. FIOH also has earlier

developed a group method for promoting re-employment and mental health among the unemployed. The beneficial impacts of the methods on career management, work engagement, employment and mental health have been verified in randomly assigned controlled field (RCT) studies.

3. Providing age facts to working life, promoting positive age attitudes and enhancing the abilities to find solutions for age-related problems. The results are dependent on country-wide dissemination through a network of trainers trained at FIOH. Central management and leadership development institutions will also participate in dissemination. Negotiations of collaboration with Policy programme for employment, entrepreneurship and working life are also ongoing.

Most of the developmental work in the theme has been done following the steps of the prevention research process proposed by Professor Richard Price and his colleagues (1985). The process starts with analysis of the problem and proceeds to planning of innovation and to prototype of the new product. After field test of the prototype, it is published and the new product is moved forward towards country-wide dissemination.

Price, R., House, J., & Gordus, J.(1985). Exploring work as an arena for prevention research: The Michigan Prevention Research Center. Prevention in Human Services 3: 4, 101-116.

Focal achievements

From School to Work: disseminating a preventive group method to vocational schools as a result from the prevention research process

Young graduates face two challenges when they start looking for their first job: firstly, they have to find a job that corresponds to their education and career plans. Secondly, after finding a suitable job, they have to succeed in the socialisation process of the work organization they enter. In addition to good education and vocational skills, the achievement of young peoples' career goals requires preparedness to use effective career management strategies.

The prototype of the From School to Work group method was developed during the years 1999–2000 in an expert team. The aim of the intervention was to increase employment, its quality, and mental health among young people during their transition from vocational college to work. FIOH utilised a social cognitive approach focusing on the application of theoretical principles to motivate and empower participants to apply effective career management and employment strategies and practices for seeking and gaining desirable employment.

The prototype was tested in a randomly assigned field experimental (RCT) study during the years 2000–2003 among 416 graduates of vocational schools in South-Western Finland. The results of the proximal effects show a very significant increase in employment preparedness. Results of long-term effects (10-month follow-up) show notable beneficial impacts of the

group method on both employment itself and how well it matched participants' education and personal career plans. The group method also had a significant preventive effect on psychological distress and depression symptoms among those initially at risk of suffering from mental disorder. Moreover, it considerably increased participants' personal working life, finances and property goals. The method was published in 2002.

The disseminating of the group method has been done in collaboration with acting organizations in the educational sector. During the years 2006–2008, FIOH has trained with other collaborating trainer supervisors: 214 group trainers in 15 training courses country-wide. More than 7900 workbooks of the method had been ordered by the end of the year during 2006–2008, indicating about the same amount of group participants. A greater role of labour administration in dissemination of the method and in group training is planned.

Koivisto, P., Vuori, J., & Nykyri, E. (2007). Effects of the School-to-Work Group Method among young people. Journal of Vocational Behavior, 70, 277-296.

Koivisto, P., Mäkitalo, M., Larvi,T., Silvonen, J., & Vuori, J. (2002). Koulutuksesta työhön [From School to Work]. Helsinki: Finnish Institute of Occupational Health.

Towards Successful Seniority case: disseminating a preventive group method to work organizations as a result from the prevention research process

Constant changes in work organizations produce increasing job insecurity and work transitions challenging the well-being and motivation of individuals. Senior employees have to face work changes to keep up with requirements of work and to stay healthy and motivated before the transition from work to retirement. Work-related strain and burnout have been studied extensively, and workplaces are considered as central arenas for the prevention of mental disorders. However, the role of work places as resource-building arenas for mental health and as sites for promotion of mental health and prevention of mental disorders is still not well recognised.

The prototype of the Towards Successful Seniority group method was developed during the years 2003–2006 in a multidisciplinary expert team to promote career management, job retention and mental health among employees in changing work life. A general aim of the method is to provide tools to companies for primary prevention by combining the knowledge bases from occupational health services regarding stress and mental health, and from human resources management regarding competencies and careers.

The prototype was tested in a randomly assigned field experimental (RCT) study during the years 2006–2008 among 711 participants from 17 organizations. The results of the proximal effects show a very significant increase in career management preparedness, the number of working life goals and intrinsic motivation to these goals. Results of long-term (7-month follow-up) effects show an increase in work engagement and a decrease in symptoms of depression. The method was published in 2008.

Resulting from demonstrated effectiveness of the method and the very good user experiences, 87 certified trainers of the method have been trained in FIOH for various organizations. A private firm providing occupational health services wanted to take the method into its service repertoire, and FIOH has made an agreement of collaboration with the firm, certifying the firm as a distributor of the method.

Vuori, J. Ristolainen, H., Larvi, T., Salokangas, T., Ahola, K., Koivisto, P., Jalonen, P., Honkonen, T., Toppinen-Tanner, S., & Salmela-Aro, K. (2008). Työuran uurtaja -ryhmämenetelmä. [Towards Successful Seniority-group method] Helsinki: Finnish Institute of Occupational Health.

Vuori, J., Toppinen-Tanner, S., Pylkkönen, M., Mutanen, P., Ristolainen, H., Larvi, T. & Nykänen, M. (2009) Työuran uurtaja -ryhmämenetelmän vaikutukset työssä jatkamiseen, uranhallintaan ja mielenterveyteen [The Effects of Towards Successful Seniority - a group method on work retention, career management and mental health]. Final report. Finnish Institute of Occupational Health.

Age Power -training programme: developing a training programme

Organizations are experiencing considerable personnel challenges due to the approaching retirement of the baby boomer generation and an eventual scarcity of workforce. At the same time, work has also changed radically because of globalisation and technological changes. Due to these prevailing mega trends, organizations have to prepare themselves for facing new kinds of age-related challenges. Failure to meet these challenges will result in short-term work careers and endanger the ability to maintain a welfare state model.

The Age Power -training programme aims at increasing age awareness at work, improving attitudes towards ageing, and demolishing negative stereotypes about work and age. Furthermore, the training programme augments organization's willingness to find and develop its own solutions for age-related problems. The purpose of the Age power -training programme is to achieve both better and longer work careers. At the same time, the goal is to enhance productivity of the organization and well-being of the employees.

The Age Power -training programme is based on the Work Ability model developed by Professor Juhani Ilmarinen. The Work Ability model will be examined from the viewpoint of ageing. The elements of work ability will introduce how work and age-related problems can be solved by the means of age management. With the right kind of age management and organization of work tasks, age can become an asset rather than a challenge for organizations.

The dissemination of the training programme will be carried out in collaboration with different networks. In the next phase, FIOH specialists will focus on creating a comprehensive network of skilled trainers. The biggest management and leadership development institutions will also include the Age Power -training programme into their services. Thirdly, FIOH specialists will also provide consultancy for a limited number of direct company clients.

Ilmarinen, J. (2005). Towards a longer worklife! Ageing and the quality of worklife in the European Union. Finnish Institute of Occupational Health & Ministry of Social Affairs and Health: Helsinki.

2. Solutions for reduction of sick-leaves and disability

Aimed impact

The aim is that people participate more in working life in spite of illnesses and symptoms of diseases. Main targets for the activities are the employees having symptoms of ill health, the foremen in work places and the occupational health services in their primary health care role.

Individual activities were targeted to (secondary) prevention of sick-leaves and better and faster recovery from musculoskeletal diseases and psychiatric symptoms. The methods include implementation of research to practical guidelines and processes in the work place, between the work place and occupational health service, inside the occupational health services and between the occupational health service and specialist services such as psychiatric clinics.

Aimed impact process

The main strategy is to develop research-based products which enhance participation in working life during the periods of ill health. These innovative ways of operation are themselves studied by RCTs, and if effective, disseminated through guidelines, training programs and new regulation e.g. in part-time sick leave. The new ways of functions were searched in:

1. Introduction of early part-time sick-leave in musculoskeletal disorders (RCT)

Part-time sick-leave has been widely used in the other Nordic countries. In Finland, part-time sick-leave was first introduced in return-to-work context. To study the feasibility and effects of part-time sick-leave already at the early stage of sickness, absence due to musculoskeletal disorders a randomised controlled trial is on-going in collaboration with the occupational health services of several enterprises. The used model and practices in the study, and the results on feasibility, will be utilised in developing new legislation on part-time sick-leave with immediate nation-wide impact.

2. Prevention of upper extremity disorders (in occupational health) (RCT)

Upper extremity disorders present a problem at workplaces, and little evidence exists on the effects of workplace interventions. The aim of the ongoing randomised study is to develop early diagnosis and prevention of UEDs in the occupational health service. FIOH has developed and are testing a new model for planning and implementing work modifications for the employees with work-related UEDs. In this model, the employee and occupational health service together assess the work loading, and possibilities to modify these factors, and together with the employer agree to the changes to be made at the workplace. Possible work modifications include changes in work ergonomics in the mode of working or other work arrangements (e.g. change to another task temporarily or work rotation).

3. From clinical guidelines to practical tools in the treatment of depression

Occupational health services and psychiatric clinics are trained to collaborate in diagnostics and the treatment of depression, which is the most important single cause of ill health in working age. Diagnostic tools, consultation practices, collaboration in occupational health and therapeutic practices are developed in practical collaboration with occupational health service units. The first year of the three year program has been successful in dissemination of

guidelines and training of the collaborative practices between occupational health service and psychiatric clinics.

4. Reducing the effects of occupational allergy on employees

Allergies and diseases related to allergy, e.g. asthma, are rapidly increasing in Finland as elsewhere in the world. The impact on work ability is remarkable. FIOH develops tools and solutions to assess and intervene in the allergy-related burden on working life.

Focal achievements

Use, effects and feasibility of part-time sick-leave

Compared with complete absence from work, part-time sick-leave is assumed to have positive effects on health and well-being, and is believed to facilitate a return to full-time work. Part-time sick-leave has been available in the other Nordic countries from the first day of the sickness absence period. In Finland, part-time sick-leave was not introduced until 2007, and is not available until after 60 days of full sickness benefit, and can be obtained for a total of 72 sickness benefit days within a two-year period. The new law was criticised by the occupational health community and other parties before it was enacted, and in 2008 it has been proposed that part-time sick-leave should be possible even earlier. It was also recognised that there is, in general, very little scientific evidence on the effects of part-time sick-leave.

Literature on the use, effects and feasibility of partial sick-leave in the Nordic countries was reviewed in order to effectively utilise the Nordic experience in the development of legislation. It was found that the use of the benefit varied widely in the Nordic countries, although acceptance was high. Hindrances restricting its use were inflexible work arrangements and poor collaboration between actors. Although part-time sick-leave is possible from the first day of sick-leave in other countries, it was typically used after a longer spell of full sick-leave.

Questionnaire surveys of occupational physicians have been carried out in collaboration with the National Insurance Institution regarding their knowledge about, attitudes towards and experiences with using part-time sick-leave, as well as the experiences of the recipients of part-time sick-leave. Occupational physicians had positive attitudes towards part-time sick-leave, and they thought it most suitable for encouraging a return to work in subjects with low-back and mental disorders. Most of the part-time sick-leave recipients thought that the leave had had beneficial effects on their health. The shorter the preceding sick-leave period had been, the more frequently part-time sick-leave was considered beneficial; this association was strongest for those with musculoskeletal disorders. The subjects also reported that it had been rather easy to make the necessary arrangements at the workplace.

A randomised controlled trial was started to assess the feasibility and effects of early part-time sick-leave for employees with musculoskeletal disorders. The hypothesis is that if work time is temporarily reduced and work load adjusted at the early stages of disability, employees with musculoskeletal disorders will have fewer disability days and return to regular work duties faster than employees on conventional sick-leave. At present, a sufficient study base (N≥30 000) has been recruited to carry out the study. A report on a feasibility study of early part-time sick-leave will be ready in 2009, after which the information can be utilised in the development of the current law. Preliminary results will be available in 2010 and the project will be completed in 2011.

A regular course on good sick leave practices for occupational health and safety personnel and personnel administration was introduced by FIOH in 2006 and has since then been held regularly in Helsinki, Tampere and Turku.

Kausto J, Miranda H, Martimo KP, Viikari-Juntura E. Partial sick leave − review of its use, effects and feasibility in the Nordic countries. Scand J Work Environ Health. 2008 Aug;34(4):239-49.

Kausto J, Virta L, Joensuu M, Vuorinen H, Kivistö S, Jahkola A, Martimo K-P, Klaukka T, Viikari-Juntura E. Osasairauspäiväraha Suomessa — etuuden saajien kokemuksia ja työhön paluu (Part-time sick leave in Finland − experiences of use and return to work of recipients Helsinki: Kansaneläkelaitos. Sosiaali- ja terveysturvan katsauksia 2009:X (National Insurance Institution. Reviews of social and health benefits. (in press).

Martimo KP, Kaila-Kangas L, Kausto J, Takala EP, Ketola R, Riihimäki H, Luukkonen R, Karppinen J, Miranda H, Viikari-Juntura E. Effectiveness of early part-time sick leave in musculoskeletal disorders. BMC Musculoskelet Disord. 2008 Feb 25;9:23.

Varonen H, Kivistö S, Jahkola A, Virta L, Klaukka T. Työterveyslääkäreillä valmius hyödyntää osasairauspäivärahauudistusta (Occupational health physicians are well prepared to utilise part-time sick leave). Suomen Lääkärilehti 2007 (The Journal of the Finnish Medical Association); 45: 42-43.

Prevention of upper extremity disorders − from risk factor assessments to intervention studies, development of current treatment practices and dissemination of information via education and providing expertise to legislation

Controversial concepts exist on the role of work-related and individual factors in upper extremity disorders and the potential of ergonomic interventions in their prevention.

New knowledge about risk factors for clinically defined rotator cuff syndrome, epicondylitis and carpal tunnel syndrome was obtained from two major studies, the Health 2000 Survey and the Prospective Upper Extremity Musculoskeletal Disorder Study, carried out in collaboration with a research unit in the Washington State Department of Labor. The Health 2000 Study produced population-based prevalence estimates for upper extremity disorders and risk estimates - both cross-sectional and longitudinal - for physical work exposures, adjusting for individual, lifestyle and health-related factors. In the North American Prospective Upper Extremity study, the individual assessment of physical work exposures was based on observations and measurements.

The effectiveness of a participatory workplace intervention in collaboration with the worker, supervisor and the occupational health service at an early stage of upper extremity disease was assessed in a randomised controlled trial. Almost 200 workers were recruited. Preliminary results suggest favourable effects on sick-leaves and productivity. Analysis of results and reporting are underway and will be completed in 2009–2010.

A group-randomised intervention study among municipal kitchen workers using a participative ergonomic approach did not show any effect on musculoskeletal symptoms, although more than 400 changes were implemented. A subgroup analysis on shoulder pain, however, showed a 60% reduction among those whose physical load, especially lifting at work, decreased.

The studies above have produced in total 12 international original papers during 2006-2008, of which two are listed below.

The researchers of the Institute played a key role in the preparation of evidence-based treatment guidelines for repetitive strain injuries of the hand and forearm in collaboration with the Finnish Medical Society Duodecim and the Finnish Association of Occupational Health Specialists. In conjunction with the guidelines, an internet-based video tutorial on physical examination of the upper extremities was prepared in collaboration with Duodecim. The guidelines and the video material have served as tutorial material in education, and this work prompted a very popular annual course "Upper Extremity Workshop" organized by the Institute both in Helsinki and Oulu since 2005.

The researchers also provided a review on the risk factors and diagnostics of lateral epicondylitis and carpal tunnel syndrome for the Working Group to reform the legislation on accident insurance and occupational diseases, set up by the Ministry of Social Affairs and Health. A researcher of the Institute provided expertise also to a Panel set up by the Norwegian Ministry of Labor to assess which musculoskeletal disorders should be considered as occupational diseases.

Miranda H, Heliovaara M, Viikari-Juntura E, Knekt P, Punnett L. Physical work and chronic shoulder disorder. Results of a prospective population-based study. Ann Rheum Dis. 2008;67(2):218-23.

Shiri R, Viikari-Juntura E, Varonen H, Heliövaara M. Prevalence and determinants of lateral and medial epicondylitis: a population study. Am J Epidemiol. 2006;164:1065-74.

Varonen H, Viikari-Juntura E, Pasternack I, Ketola R, Malmivaara A, Rahkonen E, Havulinna J, Arola H. Hand and arm strain disorders (Current care - guideline, in Finnish). Duodecim 2007; 123: 1616-26.

Interactive implementation - from clinical guidelines for depression to practical tools in occupational health care and improvement in collaboration with the workplace

FIOH has shown in a nationally representative study that despite a remarkably increased use of antidepressants and improved practice guidelines for depression, a considerable proportion of the people granted long-term work disability for depression has not received even the minimally required treatment. At the same time, the Ministry of Social Affairs and Health in Finland has introduced a policy programme for enhancing the mental health of workers and preventing premature exit from the labour market. In line with the aims stated in the programme, the Finnish Institute of Occupational Health has prepared new evidence-based clinical guidelines for the treatment of depression in occupational health services. Furthermore, collaboration between occupational health care and the workplace in attempts to manage work disability and sickness absenteeism has been highlighted as an important but hitherto neglected issue.

The FIOH project builds on interaction and constructs concrete and practical guidelines and tools in order to overcome obstacles in the implementation of general clinical guidelines. FIOH has conducted a field survey (n=920) in collaboration with a specialist network. By means of the survey, we determined the structural, educational, and motivational obstacles to evidence-based and clinically adequate treatment processes and encouraged the field to re-evaluate their practices, share their experience regarding the best practical models and tools, and express their needs. In addition to the official guideline, FIOH researchers have published a practical guidebook 'Treatment of depression in occupational health service' for occupational health services. Then a 3-year series of national conferences was put into operation on the basis of the new clinical and practical guidelines and field response. Each conference brings together successful local treatment or collaboration models and presents them to the audience. The participants are not only employees from occupational health services, but also local psychiatrists and representatives of the employers. Each conference is preceded and followed by a survey of the participants in order to evaluate the effectiveness of implementation.

FIOH also launched a pilot case study in one occupational health service to test the model in practice. All aspects of the best practice are taken into account in the pilot project: education of the occupational health service to adopt the principles of the guideline, practical tools in relation to treatment of depression, evaluation of the effectiveness of the implementation process, and engagement of the workplace in terms of training the managers.

To further focus on the importance of workplace engagement in the process, FIOH will also launch a training programme which aims at increasing knowledge on depression at work, improving attitudes towards depression, and reducing negative stereotypes about depression, as well as providing tools for managing sickness absenteeism. The dissemination of the training programme will be carried out in collaboration with management and leadership development institutions.

Ahola K, Kivimäki M, Honkonen T, Virtanen M, Koskinen S, Vahtera J, Lönnqvist J. Occupational burnout and medically certified sickness absence: a population-based study of Finnish employees. J Psychosom Res. 2008 Feb; 64 (2):185-93.

Ahola K, Honkonen T, Virtanen M, Aromaa A & Lönnqvist J. Burnout in relation to age in adult working population. J Occup Health. 2008 Jul; 50(4):362-5.

Pirkola S, Honkonen T, Pasternack I, Helaskoski E, Liukkonen V, Varjonen J. Occupational health good practices : depression (in Finnish) Duodecim, 2008, Terveysportti.

Tuisku K, Rossi H. Treatment of depression in occupational health services (in Finnish) (guidebook). FIOH, 2008.

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: +++

- R&D activities in this strategic goal have been successful in gaining outside funding from different sources during 2006-2008. FIOH's researchers in this field have vast experience and e.g. the new methods developed for increasing participation in work life among junior and senior citizens have shown to be effective in increasing their skills and capacity to start and maintain their occupational careers.
- Work career enhancement has used and applied results from stress research and health resource psychology. Observational end clinical epidemiology has been used in the prevention of the burden of musculoskeletal and psychosocial diseases. Prevention research is used in implementation and dissemination of the results of research.

Efficiency of implementation process: ++

The R&D efforts have produced training methods and tools which have shown to be effective. They have been implemented: From school to work -group method to vocational schools and Towards successful seniority has been adopted in one of the largest OHS providers toolkit. Expanding these methods is continuing in 2009. Part-time sick-leave will be encouraged to be used in the early phase of sickness by new legislation in 2010.

Use of partnerships and cooperation in improving effectiveness: ++

FIOH has developed these methods and tools very effectively together with clients, enterprises, vocational schools, employees and employers, as well as the ministry of Social Affairs and Health authorities and advisory boards (including tripartial cooperation). The ideas of part-time sick-leave have been adopted as a proposal of the parliamentary committee (SATA). Implementation of the Depression clinical guideline produced as one of the tools in this programme is well underway among target organizations: OHS doctors, nurses and psychiatrists.

Achieved impact: +

The objectives of the two programmes of this strategic goal have been relatively well achieved at the midway station: tools have been developed and implementation is moving rapidly through training, information and also through FIOH's services (consultations). In most cases, the achieved impact in information dissemination is at level 4, but the effects on participation in working life are still on the way to be demonstrated. Rapid changes in economy may drastically change the view in working life participation.

3.7 Controlling new occupational hazards, exploiting new opportunities.

Overview

Technical, economic and social developments are changing work and the ways it is organized. Scientific progress is deepening FIOH's understanding of how work-related factors affect health. New observations can challenge the previous understanding. Improvements in working life and advancements in science may help to remove occupational health hazards and improve the well-being of the working population. Yet, the development of working life may also bring new types of risks.

FIOH systematically analyses working life to better understand and predict where the development of working life is headed at a given time. It follows the latest research data and techniques and assesses the possibilities of utilising them in its field. FIOH's future strategy is guided by its strategic goals.

Aimed impact

- To produce new information about changes in Finnish working life
- To produce information about the development of new technological risks and their effects on Finnish working life
- To produce new knowledge to identify exposure, interactions, mechanisms and new OH&S health risks
- To produce new innovations, solutions, advice and information based on R&D&I in wide client and partner networks to promote worker health and well-being

The main impact process of this strategic goal is based on R&D networks linked with efficient dissemination of information through scientific meetings, publications, books, media and contacts with companies and authorities on both national and international levels (see Figure 3.7.1.).

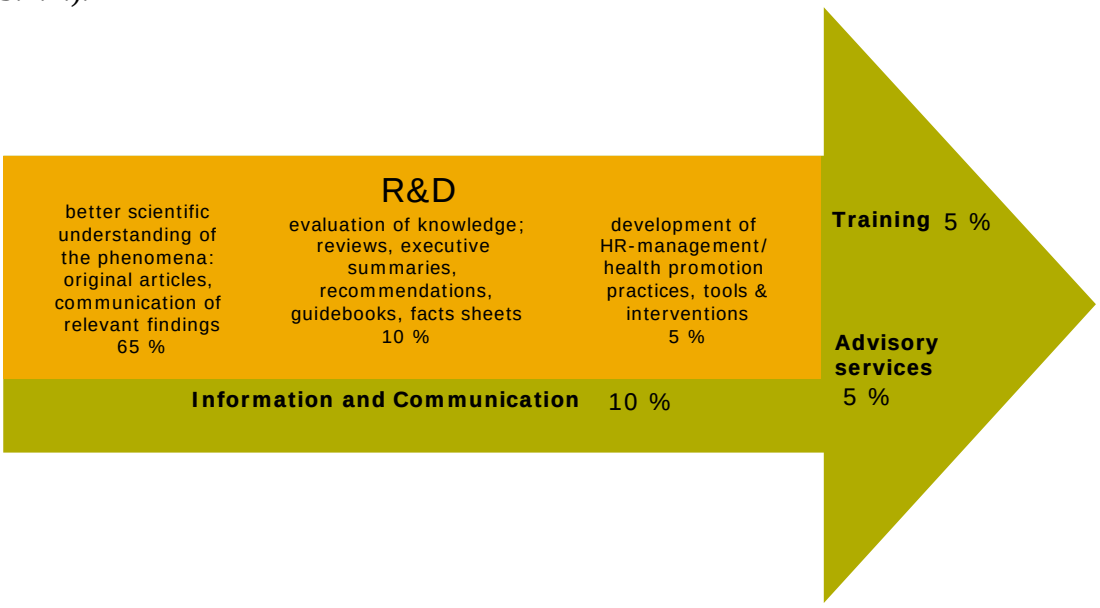


Figure 3.7.1 Allocation of resources according to the mode of operation.

Programmes

1. Current Changes and Future Trends in Finnish Working Life

Aimed Impact

The basic aim is to analyse in a social scientific perspective overall developments in Finnish working life. The activity's purpose is to help FIOH and its collaborating partners to better understand these developments and the societal forces that produce them. A special focus is laid upon the future prospects and challenges of Finnish working life so that the Institute can direct its resources to those problem areas which are most relevant in tomorrow's working life.

The most valuable contribution is to provide the key actors and the general public with first-class information about the current state of Finnish working life and about its particular strengths and weaknesses. Another key task is to provide various actors with adequate and appropriately timed information about those new developments that must be taken into account in order to adjust the Finnish institutions of work in a successful manner into a changing competitive environment. Thirdly, it is important is to provide the key actors with correct information about those needs and expectations that new generations are directing towards their work.

Aimed Impact Process

The area of expertise was established together with the launch of the Institute's current strategy. In 2006, a collection of articles was published about current transformations in Finnish working life and those problems that should be better researched in future. In 2007, a nationwide survey has been conducted about citizen attitudes towards changes going on in working life, and a still continuing study analyses Finnish experts' views about the future of working life in Finland. Further studies are made for instance about the working life expectancies of people working in different sectors and occupations, the Europeanisation of policies to promote health and well-being at work, as well as about the extent to which the legal obligations concerning the health and safety of employees are put into practice and omissions sanctioned in different kinds of workplaces. Organizational-level analyses have been made about possibilities to increase flexibility in a manner that is beneficial both for the employers and the employees, and Delphi studies have been made in order to identify those health and work environment risks that arise as a consequence of the introduction of nanotechnology and other highly advanced technologies.

The research activities in this area haven't yet reached the level and visibility required of one of the focus areas of FIOH's ongoing research activities. However, the work done will help both FIOH itself and some of the key actors in Finnish life to see rather early on the actual character and scale of those dramatic changes that are currently going on in the world of work globally. In future, emphasis will be laid upon a more international orientation of the Institute's research activities in this area. Movement towards more sustainable systems of work will be taken up as a key strategy with the help of which Finland and the other Nordic countries are able to proceed towards a new era of dynamic, but at the same time socially, humanely and environmentally balanced growth.

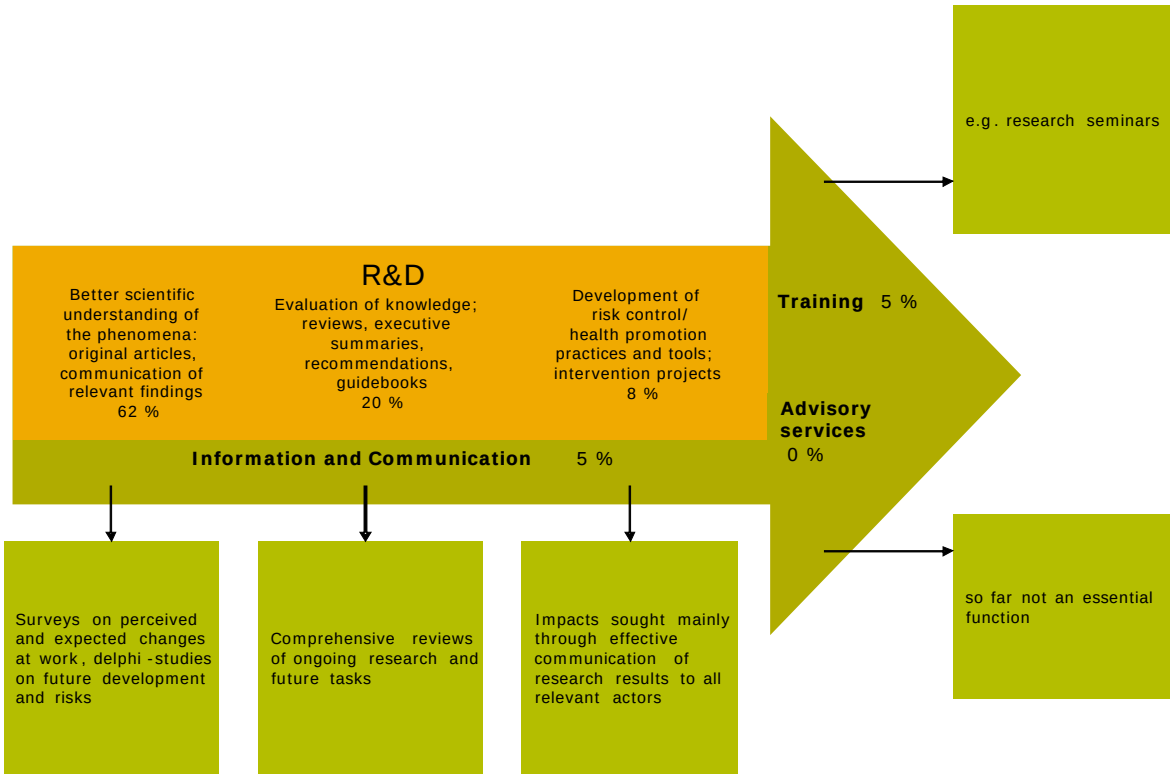


Figure 3.7.2 Allocation of resources according to the mode of operation.

2. Health Risks of Engineered Nanoparticles and Nanomaterials

Aimed impact

The general aim of the activity is to explore the importance of engineered nanoparticles and nanomaterials (ENP) and their applications in nanotechnologies (NT) as a potential human health risk in occupational environment. The goal is to build the knowledge base of potential health hazards of and exposure to ENP. Another goal is also to identify industrial sectors in which ENP is mostly used. A key goal is also assessment of exposure to ENP.

NT belongs to enabling technologies that find applications in almost any industrial sector. Their production and use in consumer and industrial applications has become wide-spread. Annual production of the most important nanomaterials, carbon nanotubes, has increased several thousand-fold during last few years. Recent observations of the serious health hazards of carbon nanotubes, lung inflammation and mesothelioma emphasise a need for quick actions to explore the safety of ENP.

FIOH has explored the role of titanium dioxide (TiO2) nanoparticles and carbon nanotubes to induce genotoxicity and pulmonary inflammation in mice and cells; both ENP induce these effects. FIOH has developed a sophisticated exposure method for ENP for studies with mice, and generated an advanced sampling and sample characterisation strategy for ENP; 35 different ENP have been characterised and published in a NanoAtlas publication. Exposure assessments have shown that exposure to TiO2 takes place in occupational environments. These studies have been carried out during 2005-2008 with a large number of domestic and EU research organizations and several industrial partners.

FIOH has promoted the concept of combining ENP and NT safety research with general NT research, and these efforts have been effective as indicated by industry-coordinated domestic and EU research projects lead by industry. Today, in ENP and NT safety research, FIOH has a remarkable impact on nanosafety activities in Finland and the EU where FIOH has become a hub in the field. The goal is to increase collaboration with the ENP industry and widen the research collaboration with research partners. So far these efforts have been very successful.

Aimed impact process

To achieve the aims, FIOH has utilised the means shown in the figure. The aim has been to produce high-quality research knowledge to explore health effects of and exposure to ENP.

High-level expert status of FIOH in nanosafety in Finland and the EU and beyond has enabled it to develop a well recognised research programme in Finland and the EU through intense networking. Relevant research knowledge has been implemented into EU regulations and disseminated among the general public. In these projects, FIOH has also collaborated with the social partners and EU organizations such as the European Agency for Safety and Health at Work.

Chapters in books, booklets, and media visibility have been other avenues for implementing research knowledge into practice. The main purpose of the dissemination of information has been to raise public awareness of the importance of safe ENP and NT.

Focal achievements

Exposure assessment and genotoxic and immunotoxic effects of engineered titanium dioxide nanoparticles

Background

Titanium dioxide nanoparticles (nano-TiO2) are currently used in large quantities worldwide for several industrial and consumer applications. For example, many surfaces are coated with reactive nano-TiO2 in places where hygienic requirements are high, and nano-sized TiO2 are used in energy technology. The large number of applications means that the number of workers exposed to these engineered nanoparticles and nanomaterials (ENP) can be high and is most likely increasing. Alarmingly, there is no technology currently available for reliable separation of the background nanoparticles from ENP such as nano-TiO2. Knowledge of the health effects of nano-TiO2, including genotoxicity and immunotoxicity, are very limited, rendering risk assessment for nano-TiO2 a challenge.

What was done and found

Levels of nano-TiO2 in workplaces were measured before activities related to nano-TiO2, and then ambient air levels of nano-TiO2 were monitored in the same workplaces during operations when nano-TiO2 was used. Depending on the process, an association between the handling of nano-TiO2 and exposure was found, but the association was not consistent. However, for the first time, data on exposure to nano-TiO2 was provided.

Nano-TiO2 induced genotoxic effects in nano-TiO2 in vitro in a dose-dependent manner, and these effects were associated with exposure time. This indicates that interactions between nano-TiO2 and genetic material need to be considered when assessing the potential health effects of nano-TiO2. In mice, exposure to SiO2-coated nano-TiO2 particles elicited clear-cut pulmonary neutrophilia. The particles accumulated almost exclusively in alveolar macrophages. Pulmonary neutrophilia was accompanied by the increased expression of relevant inflammatory mediators. In vitro exposure of human macrophages to SiO2-coated nano-TiO2 elicited responses similar to those found in animals. The immunotoxic effects of nano-TiO2 were modified by surface coating of the particles with SiO2, rendering them more active than mere nano-TiO2, emphasising the importance of the surface chemistry of ENP.

Relevant client needs

This research provides, for the first time, information which can be used by companies and regulators for appropriate risk assessment of nano-TiO2 exposure to individuals. Companies need this information for the registration of new products and to produce a safety data sheet and regulators for risk assessment and control. The information can also be used to communicate possible nano-TiO2 risks to the public at large.

Dissemination of information

The new information is not yet ready to be widely distributed and used. However, a Nanoatlas providing careful characterisation of various ENP, including nano-TiO2, has been produced. It also contains information on a strategy for exposure assessment (sampling strategy for ENP). New knowledge of the genotoxic and immunotoxic effects of nano-TiO2 can be used in communication.

Potential for further development

The approaches generated by this research can be widely applied in research exploring exposure to and effects of various ENP. Thus, they provide a useful foundation for the development of a great number of applications for research on ENP. These findings emphasise the importance of taking into account modifications of ENP properties which may change their toxicological potential and thus the consequences of exposure.

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Schulte PA, Geraci CL, Zumwalde RD, Hoover MD, Castranova V, Kuempel ED, Murashov V, Vainio H, Savolainen K. Sharpening the focus on occupational safety and health of nanotechnology in the workplace. Scand J Work Environ Health - online first (2008)

3. Biomedicine in the control of work-related hypersensitivity disorders and musculoskeletal diseases

Aimed impact

The general aim of the activity is to increase the knowledge of the inflammatory mechanisms and genetic factors, and their relation to the environmental factors, in the development and maintenance of work-related hypersensitivity disorders and musculoskeletal diseases. FIOH will utilise state-of-the-art methods and techniques used in the modern biomedicine and also take an advantage of the well-characterised patient cohorts in its research. The results of this activity have the potential to substantially facilitate the improvement of diagnosis, prevention and treatment strategies of work-related allergies and musculoskeletal diseases.

Allergic diseases have increased dramatically in industrialised countries during the last two decades. A substantial proportion of work-related diseases is allergies. FIOH has explored inflammatory mechanisms of work-related allergies utilising experimental animal models, patient materials and well-defined cell models. With this multidisciplinary approach, together with a large research network, we have gained new information about sensitisation mechanisms and also identified new candidate molecules which may play an important role in the pathogenesis of work-related allergies. FIOH has also generated tools to measure specific allergen levels from the products used by workers and consumers (exemplified in Focal achievement Case 1)

Musculoskeletal disorders are known to have a multifactorial etiology, both work-related and individual factors playing a role. FIOH has investigated associations of lifestyle factors and a set of cardiovascular risk factors with musculoskeletal disorders. FIOH has also set up the research consortium aiming at identifying the relative roles of modifiable and non-modifiable risk factors in musculoskeletal disorders. New approaches, such as Mendelian randomisation and pathway analysis, will be applied in the assessment of modifiable factors in low-back disorders.

Exposure to damp building moulds has been associated with a variety of adverse health effects, such as cold and flu-like symptoms, pulmonary inflammation and exacerbations of asthma. Moisture-damage building problems are extensive in Finland, but the knowledge of the mechanisms behind damp building-related illnesses is very limited. FIOH's research have revealed previously undiscovered mechanisms behind the mould-induced health effects,

which give grounds for improvement of diagnosis and facilitate the development of better prevention strategies (exemplified in Focal achievement Case 2).

An important corner stone of the scientific and technological competence of this activity is formed by the extensive collaboration with a large research network including several national and foreign universities and research institutes. This activity has also received substantial external funding from the European Union and from national funding organizations such as the Academy of Finland, the Finnish Work Environment Fund and the Finnish Funding Agency for Technology and Innovation (TEKES).

Aimed impact process

This activity is focused mainly on increasing FIOH's understanding of the pathomechanisms and etiology of the work-related diseases. The purpose is to bring together strategically important work-related diseases and apply recent advances in the technologies used in the biomedicine in their research. Thus, a great majority of FIOH's impact is coming in the short run from the production of high-quality original research articles. It is, however, anticipated that in the long run the results from this activity will substantially facilitate the improvement of diagnosis, prevention and treatment of these diseases.

Focal achievements

Case 1: Natural Rubber Latex Allergy: Investigation of immunological mechanisms in mouse models and development of an assay for measurement of major allergens in latex products

Natural rubber latex (NRL) allergy has been an important health issue for two decades. Gloves and other NRL products cause contact urticaria, rhinitis and asthma in NRL-allergic health care workers and may sensitise patients during surgical operations. A major goal of the present study was to investigate the importance of cutaneous and airway routes in allergic sensitisation and the subsequent inflammatory responses to NRL allergens. The immunological method for allergen measurement from NRL products was also developed.

As respiratory symptoms are as common as skin reactions in many NRL allergy cases, we investigated the significance of different allergen exposure routes in the development of lung inflammation and airway hyperreactivity. The study revealed that cutaneous exposure to proteins eluting from latex products may significantly contribute to the development of asthma in latex allergy. Glove powder is the most important carrier of NRL allergens to airways, and thus primary prevention has mainly focused on the use of non-powdered latex gloves. Since the exposure, via the cutaneous route, could be an important way for sensitising airways, attention will need to be paid to the use of low- or non-allergen NRL gloves instead of using only non-powdered gloves. The study was published in the leading dermatology journal, The Journal of Investigative Dermatology (1). The study was selected as the best research article in the field of health research in 2005 at FIOH.

Assessment of the allergenic potential of medical devices made of NRL requires the measurement of concentrations of specific allergenic proteins or polypeptides eluting from rubber. In the present study, four NRL allergens were quantified in medical glove brands marketed in Finland by a capture enzyme immunoassay using monoclonal antibodies (2). Our findings reveal that by comparing the sum concentration of four selected NRL allergens with results obtained in human IgE-ELISA inhibition, it was possible set a cut-off level (i.e. 0.15 microg/g) below which virtually all gloves contain low or insignificant amounts of allergens, and can be considered low allergenic. The American Society of Testing and Materials (ASTM) adopted this immunoenzymetric assay for NRL allergen measurement as a new ASTM Standard on August 2008 (3).

Present findings reveal important new information about the sensitisation mechanisms of latex allergy which facilitates the design of improved strategies for allergy prevention. Our findings also demonstrate that the developed immunoenzymetric assay is highly suitable for evaluation of allergenicity of latex products. Due to acceptance of this method as a new ASTM Standard, it is anticipated that a substantial proportion of latex products will be tested in the future using this method. It is also likely that this method, and the establishment of a cut-off level for low allergenicity, will guide consumers, regulatory authorities and latex producers to the use and the production of low-allergenic latex products. Ultimately, this will lead to a decrease in the prevalence of latex allergy cases worldwide, a phenomenon which is already apparent in Finland.

These studies were done in collaboration with the TE-IMMUN, TE-SYNTY and TE-YLIHE teams at FIOH. These studies also entail close collaboration with the National Public Health Institute, the Institute of Biotechnology (Helsinki) and the University of Tampere, as well as a network of foreign universities and research institutes.

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2. Palosuo T, Reinikka-Railo H, Kautiainen H, Alenius H, Kalkkinen N, Kulomaa M, Reunala T, Turjanmaa K. Latex allergy: the sum quantity of four major allergens shows the allergenic potential of medical gloves. Allergy. 2007 Jul;62(7):781-6.

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Case 2: Immunological mechanisms of Stachybotrys chartarum, an important moisture-damage building mould, and its health effects

Exposure to damp building moulds has been associated with a variety of adverse health effects, such as cold and flu-like symptoms, pulmonary inflammation and exacerbations of asthma. Stachybotrys chartarum is a damp building mould that can be found in large quantities in water damaged buildings. Several studies suggest that exposure to this microbe may have hazardous health effects. Certain strains of S. chartarum are capable of secreting trichothecene mycotoxins, which may critically contribute to the mould-induced illnesses. Although the moisture-damage building problem is extensive in Finland and in several other countries, the knowledge of the mechanisms behind damp building-related illnesses is very limited.

Because an atopic predisposition and inflammatory status may influence the response to microbes, FIOH examined the effects of S. chartarum on allergic mice. FIOH's findings in mice demonstrated that exposure to the S. chartarum spores has dramatic synergistic effects to the pulmonary inflammation of experimental asthma, suggesting that exposure to damp building moulds may significantly exacerbate allergic airway inflammation in humans as well. The study was published in the highest-ranked respiratory system journal, The American Journal of Respiratory and Critical Care Medicine (1), and was selected as the best research article in the field of health research in 2006 at FIOH.

FIOH also explored the immunological mechanisms of a trichothecene-induced inflammation in human macrophages. FIOH's findings reveal the molecular pathways in which mycotoxins, together with environmental endotoxins (LPS), synergistically activate proinflammatory cytokine mediated inflammatory response in the cells. In water-damaged buildings, toxic S. chartarum grows together with other moulds and bacteria. Our new findings suggest that mould-secreted trichothecenes are able to induce massive inflammation in the context of simultaneous exposure to endotoxins or other immunomodulatory microbial agents, which is often the case in real-life. This study will be accepted for publication after minor revision to the respected immunological journal, The Journal of Immunology (2).

There is urgent need for information about the pathomechanisms of damp building mould diseases, as it is a prerequisite for their valid diagnostics and effective treatment and prevention. Present findings reveal previously undiscovered mechanisms behind the mould-induced health effects, which give grounds for improvement of diagnosis and facilitate the development of better prevention strategies. FIOH's results suggest that special attention should be paid to the inflammatory status of the patients, in addition to the characterisation of microbial exposure agents. FIOH's findings also propose that determination of the levels of microbial toxins and other immunomodulatory components in parallel with conventional microbial characterisation is important in the risk assessment of the work place.

These studies have been done in close collaboration with the TE-IMMUN and TE-SYNTY teams at FIOH and with the University of Helsinki.

1. *Leino MS, Alenius HT, Fyhrquist-Vanni N, Wolff HJ, Reijula KE, Hintikka EL, Salkinoja-Salonen MS, Haahtela T, Makela MJ.* Intranasal exposure to Stachybotrys chartarum enhances airway inflammation in allergic mice. Am J Respir Crit Care Med 2006; 173:512-8.

2. *Kankkunen P, Rintahaka J, Aalto A, Leino L, Majuri ML, Alenius H, Wolff H, Matikainen S.* Trichothecene Mycotoxins Activate Inflammatory Response in Human. J Immunol (under revision)

4. Using knowledge of human neurocognition and physiology in the planning of future information work

Aimed impact

Information and technology intensity and mobility of work is steadily increasing. Information handling skills with constantly changing IT devices, changes in work content and the need for life-long learning, combined with irregular working hours, demand new methods for studying the working brain. Applied neuroscience aims at producing information that can be used to ensure that work now and in the future takes into account human factors of cognition and neurophysiology. Additionally, with the adoption of novel, emerging interaction (information) technologies, current work environments and tools are changing at an increasing speed, creating a need for new, multimodal laboratory setups for studying neurocognitive ergonomics and usability issues of new technologies in the context of work.

The programme has two main aims:

1 Research and development (R&D) of methods for estimating the overall brain and cardiovascular physiologic state and load during work tasks that cognitively simulate modern work demands. Through this R&D, the effects of changing cognitive and mental load on human performance and physiology, as well as their interaction, are studied. In a highly controlled laboratory environment, methods and outcome measures that best represent work-load effects will be identified and further developed for use in field studies at work places. The focal achievements obtained thus far are presented in the case "measuring brain load". Further R&D projects are on their way for implementing these results into practice. Currently, FIOH is studying, with developed methods, cognitive performance and physiologic responses in IT experts experiencing excessive workload. Concomitantly together with an IT sector corporation and its occupational health service (OHS) provider, FIOH is developing new approaches and practises that will assist in the follow-up of brain well-being and cognitive fitness of workers and aid in the early identification of dysfunction. Solutions for restoring work ability and supporting workers with disabilities are provided that human resources of companies can also use.

2 To study how emerging information technologies and interface solutions affect the neurophysiologic state of the individual and how they support good cognitive task performance. To meet these challenges, a new laboratory has been built in which physiologic measurements and technology are linked together. The focus is on ambulatory recordings, so the subjects are free to move around while performing the designated tasks, e.g. with handheld and mobile information technology (IT) devices. As an example, FIOH is currently testing the feasibility and reliability of several protable neurophysiology devices for field studies. Additionally, FIOH has linked mobile (emerging) ICT technology into study setups. In 2008, FIOH started a new R&D project in which the effect of small head/spectacle mounted displays on situational awareness in demanding, high-fidelity operation situations (crisis management, fire and rescue services) is being studied.

Aimed impact process

To ensure the R&D has practical impact, all projects are carried out in collaboration with R&D units of medical and information technology enterprises, companies using modern

technology and HR and occupational health services. As an example of the success of this approach, FIOH is, in the area of neurocognition and ergonomics, actively participating in the negotiations aiming at founding a large national Strategic Centre for Science, Technology and Innovation on health and well-being. One of its main aims is to link high-quality research of universities and institutes with corporate R&D units and service providers operating in the health sector. The goal is to produce new technological innovations, knowledge and services for this sector. Promoting brain health in working life is one of the key areas represented in the preliminary work packages.

Focal achievements

Measuring brain load to promote brain health and cognitive fitness at work

Neuroergonomics (as defined in 2003) is the study of the brain and behaviour at work. It merges neuroscience with ergonomics (human factors). In a 24/7 society, working environments are often information intensive and work performance requires performing multiple tasks simultaneously, i.e. multitasking. Thus, demands on human cognition as well as brain physiology are often high. In order to promote humane working conditions that ensure brain health and cognitive fitness, systems measuring brain performance and its physiological state at work places are needed. At FIOH's Brain and Work Research Centre (BWRC), we have developed a computerised test battery with which both the information load, number of tasks to be performed, and task presentation speed (work pace) can be modified. FIOH has then investigated how information derived from the electroencephalography (EEG) spectrum can be used as an indicator of overall brain load. This was done by combining physiological measurements in time synchrony with the cognitive task and then manipulating 1) external factors: the difficulty and thus mental load of the computerised tests and 2) internal factors (sleep pressure) burdening the subject. FIOH's studies show that changes in EEG spectra correlate with the effects of both internal and external factors burdening the subject. As the EEG spectra also react to changes in the cognitive demand of the task, from low to high, it offers an objective means to estimate the overall physiological state of the brain.

EEG spectral information can be measured with only two EEG electrodes and thus can be implemented into a compact, wearable device for online monitoring of the brain state in both field and clinical settings. It could be used as a first-stage diagnostic tool and follow-up measure of the overall functional state of the brain. This enables the study of the effects of various stressors on brain physiology in both daily life and work. Thus physiological and mental overload and fatigue of the brain could be detected at work. Studies on practical applications are currently underway. Coexistent development of occupational health services for promoting brain health at work, in addition to the implementation of new diagnostic tools for monitoring the overall state of brain load and performance in working life, are in progress.

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Investigation of occupational exposure to radiofrequency fields close to the base station antennas

Telecommunication sources have increased greatly in recent years, and there is continuing concern about potential adverse health effects caused by electromagnetic fields used. Relatively high levels of exposure to radiofrequency (RF) fields can occur in the broadcasting and communications industries. Mast workers in antenna towers and rooftops are an occupational group that can be exposed to RF-fields exceeding international safety guidelines (1-2). The data on EMF measurements concerning occupational exposure close to the base station antennas on rooftops and medium- or low-height broadcasting towers are very scanty. Most of the previous studies have focused on general public exposure far away from transmitting antennas. The transmitting antennas in these towers and rooftops usually transmit low-RF powers, thus having short operating ranges.

Typical transmitters are mobile phone networks, local radio antennas, amateur radio transmitters, and small digital television and radio sub-stations. Though the transmitting powers of these kinds of antennas are weaker than those of radio/TV broadcasting antennas, worker exposure may be significant compared with the exposure limits, since workers may approach the antennas very closely. Typical working tasks around antennas include antenna maintenance, painting, tightening the bolts, beacon replacement, and tower rigging and replacement. Many workers do not carry personal alarm devices warning of high electromagnetic fields; hence, they are unaware if safety limits are exceeded. The frequencies of transmitted fields from different antennas may vary notably. In our studies, the exposure of workers to RF fields was determined at 23 medium height towers and at 11 rooftops having several antennas in Finland. At the mast sites, the results indicate that the exposure was low when the ladders were placed inside the tower. According to the siting instructions, the antennas should be directed so that the main beam of transmission does not pass through the climbing space. However, many real maintenance tasks require workers to climb outside the tower. In these situations, RF exposure from the antennas was significantly higher.

Typically, antenna masts contain transmitters from different telecommunication companies and even from radio amateurs. Therefore, it is difficult to get information on the real exposure conditions in the mast. The best solution to assess occupational exposure levels is to use personal dosemeters for which a practical evaluation method was developed at FIOH (3). At the rooftop sites, the safety distances were determined for the occupational and general public situations. For the workers, the safety distance was 1 metre from the antenna main beam, while for the general public it was 2 metres, respectively. The results of these studies are disseminated by reports in the Finnish language and by a guidebook. These are directed to workers and employers providing them easily understandable instructions and information about the exposure. The results were also internationally disseminated via scientific articles and fact sheets. The new method also presents an option to improve the quality of the RF exposure assessments at mast work for epidemiological studies. The individual exposure level with the height information can be linked to relevant transmitters, hence giving information that may be expanded to concern larger professional groups as job/task-exposure matrices. The response from the employees and employers has been positive, since the reports and guidebooks can be used as risk communication materials and for planning safe working methods, hence fulfilling the provisions by the EMF Directive (2004/40/EC).

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Alanko T Hietanen M. Occupational exposure to RF fields in antenna towers. Radiat. Prot. Dosim. 2007; 123: 537-539.

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Self-evaluation

(Moderate +, Good ++, Excellent +++)

Quality of scientific knowledge applied: +++

- Top-quality research knowledge exploring the health effects of and exposure to nanoparticles, work-related hypersensitivity disorders and musculoskeletal diseases and cognitively demanding work. New R&D outcomes in methods to study the effect of work-related factors on different human biological systems.

Efficiency of implementation process/methods applied: +

- Only moderate use of the implementation process due to the future-oriented approach of the strategic aim. Close collaboration with the R&D units of health and information and communication technology corporations and those using ICT devices or providing OHS to workers has promoted the transfer of new knowledge and approaches to identify and address health hazards and health issues.

Use of partnerships and cooperation in improving effectiveness: ++

- Extensive use of partnerships in scientific work and productisation of tools for neurocognitive ergonomics

Potential impact of produced outputs: +++

- Very high potential impact of the aimed success in all programs: New openings in neurophysiologic and cognitive performance methods for carrying out fields online and long-term studies on estimating mental and cognitive workload and its effect on humans.

Achieved impact: ++

- Good and in some areas (in the programmes of the health risks of nanoparticles, work - related hypersensitivity disorders and musculoskeletal disorders) extensive achieved impact in the creation of international networks and resources for the research and development on the area. FIOH is an active participant in planning the R&D programme of the large national consortium, Strategic Centre for Science, Technology and Innovation on health and well-being. It is scheduled to start in 2009 and first programmes are to begin in 2010.

3.8 System and societal results - self-evaluation

Policy relevance of the system and societal results

In the strategic vision of the Ministry of Social Affairs and Health (Strategies For Social Protection 2015, published 2006), the following strategic objectives were set:

– people stay on at work for 3 years longer than they do at present
– the general functional capacity of the population improves
– work is more attractive and promotes well-being
– social exclusion is reduced and gender equality improved.

Based on the strategic goals of the Ministry of Social Affairs and Health, and the needs and discussion with other ministries, social partners and its main clients groups, FIOH adopted a new strategy for the years 2006-2010 and restructured its whole organization and mode of

operation. The strategy was accepted by the Board of Directors, represented by the above organizations. The interactive "innovation model" aims at effectiveness and innovations based on the interactive use of R&D, dissemination of information, expert services and training. Based on this strategy, FIOH set seven strategic goals based on anticipated major needs of its main clients, workplaces, public authorities, citizens and developers of occupational safety and health.

FIOH strategic goals for 2006-2010 are included in the annual goals given by the Ministry of Social Affairs and Health to FIOH during the years 2008-2011. Based on the emphasis on increasing participation into working life, FIOH started a thematic area "*Life Course and Work"* as well as a separate strategic goal: "*Solutions for increasing participation into working life*" (see chapter 3.6). Participation into working life has been enhanced also by the strategic goals "*Innovative, regenerative and healthy work communities*" (chapter 3.2) and "*Smoothly flowing work processes, safe and easy to use working methods and tools*" (chapter 3.5). Improvement of the general functional capacity of the working-age population has been supported by all strategic goals. Making work more attractive and promoting well-being at work was tackled especially by the strategic goals "Innovative, regenerative and healthy work communities", "Each citizen equipped to ensure his or her occupational safety and well-being", “Smoothly flowing work processes, safe and easy to use working methods and tools” and the "Solutions for increasing participation in work life". Reduction of social exclusion and the support of gender equality were supported by the programme "Promoting Gender Equality and Diversity at Work”.

The strategic goals were defined in 2006 and set for the years 2007-2010. At the moment, FIOH is only in the midway station of the execution of the programmes, and it is thus possible to give only a first estimation of the achieved results, impact and possible future effectiveness of the system and societal results of the FIOH strategy. Table x summarises the self-estimations of the different strategic aims.

Table 3.8.1 Self-estimation of the strategic goals ((Moderate +, Good ++, Excellent +++)).

Strategic goal/ estimation (very poor, poor, moderate, good, excellent)	Quality of scientific knowledge applied	Efficiency of implementation process/methods applied and potential impact of produced outputs	Use of partnerships and cooperation in improving effectiveness	Potential impact	Achieved impact
1. The management of occupational hazards at work	++	++	++	+++	++
2. Work communities	+++	+/++	+/++	+++	+
3. Citizens	++	+/++	++	+/++	+
4. Authorities	++	++	+++	++	++
5. Work processes and working methods	++	++	++	++	+
6. Increasing participation in work life	+++	+/++	++	++	++
7. New hazards, new opportunities	+++	++	++	+++	+

Applicability of the results to the clients

The R&D programmes are widely developed in cooperation with working places, occupational health care and work safety authorities supporting the applicability. The system and social results are widely available to the identified FIOH client groups. Dissemination of information, including FIOH books, booklets, popular-series books, other educational material, FIOH journals (especially the widely-distributed Work, Health and Safety), FIOH web service (www.ttl.fi) that is under intensive progress, electronic newsletter and the forthcoming electronic journal. FIOH also has weekly press releases and active relations to media and decision-makers. Extensive training programmes support the distribution of information. FIOH challenges in the area are related to the needs to more efficiently productise and transfer the developed social innovations to the mediating organizations and occupational health care.

Overall scientific quality

Based on the separate bibliographic, FIOH has produced a very high number of publications, 5637 in total, in 2004–2008. Of all the publications, 60 % were scientific publications and 40 % popular and non-scientific publications. General citations to FIOH papers are high and have an additional upward step in 2008. The highest numbers of citations were focused on the strategy-based top scientific areas of research: the area of genetic research and immunotoxicology and psychosocial issues and health. Based on the bibliographic analysis, including a separate selection of top scientific journals in the area, FIOH appears the most productive occupational health and safety research institute in Europe.

The use of partnerships, mediating bodies and other distribution channels in disseminating outputs to clients

Improving cooperation in the companies (strategic aim 1), using work places and social partners (strategic aims 1, 2 and 5), occupational health services (3.4), occupational safety executives (strategic aim 1), and developers and designers of the working places (5.1) as mediating and distribution channels for the dissemination of the outputs to the clients has been an essential part of the execution of the FIOH strategy.

High national and international co-operation with partners in the different strategic goals has also taken place. Of all FIOH scientific publications, 89 %, from 2004 to 2008, were based on collaboration with different national and international research institutes. Helsinki University and the earlier National Public Health Institute have been the most frequent scientific collaborators. Of all the scientific papers, 38% were published as international collaborations. International collaboration in scientific publications has increased 10 % during the last five years compared to earlier years.

Quality of the internal implementation process

In order to manage the strategic aims in addition to the Centres of Expertise, a matrix-like organization was selected. The Executive Committee of FIOH has intensively followed the 4-year action plan of the seven strategic goals and the 22 strategic programmes. Each member of the Executive Committee has been personally responsible for one or two of the strategic

goals in addition to directing one of the Centres of Expertise and one mode of operation (R&D, expert services, dissemination of information etc.)

Similarly, the team leaders of the Centres of Expertise have mainly been responsible for one strategic programme, in addition to contributing to other strategic aims and different modes of operation. The annual plans of action, execution and reporting of the strategic goals and the 22 sub-programmes have been the basis of each annual plan of action of the institute. The Centres of Expertise and teams have made their own plans of action based on the resource needs of the strategic goals. The used administrative model has proven to be efficient for the execution of FIOH strategy but has put the team leaders, and the directors of the Centres of Expertise, under heavy load by e.g. increasing the need of collaborative negotiations for obtaining resources for the programme. The organization has fulfilled the purpose of preventing the experts from staying their own individual silos. The chosen model also fulfils the criteria for being "unstable for design" - the demands from different dimensions are sometimes even contradictory.

Added value of the innovation model of FIOH to its clients

The solutions to client-based FIOH strategy have directed FIOH resources into issues most relevant to its clients. The strategic aims are very different in their nature; some focusing more on the primary production of new information (strategic goal 7), some directly aiming at practical dissemination of information to its clients (strategic goal 4). The integrated use of R&D, dissemination of information, expert services and training in the fulfilment of the strategic goal has been useful to the clients. A new strategy-based R&D process and scientific good practice instructions have been created to be used in all R&D projects. The new R&D process model (implemented since 1.1.2008) demands the utilisation of FIOH innovation model in the projects - changing them to R&D&I projects. Plans for cooperation between the teams, for the aimed impact process and outlines for the future distribution of the project results, are required already in the first preliminary study plans. The utilisation of the R&D projects to the clients has been observed. The development of new services, products and OH&S working models are also better supported by FIOH's own resources in R&D due to increased cooperation between the different modes of operation.

At the moment, FIOH is in the midway station of the execution of the 4-year strategic programmes. It is obvious that only moderate impact has yet been achieved, although high potential impact is related to the full execution of the ambitious strategic aims. The initiated programmes, thematic areas and other research topics of the current strategy need longer time spans to fulfil their aims and to secure and support the initiated changes.

3.9 Future challenges and planned responses

FIOH strategy 2006–2010 is based on the 'ambidextrous' innovation model, aiming at effectiveness through the interactive use of client-based R&D linked with the dissemination of information and the offering of client services and training. In addition, social innovations were sought by thematic areas, aiming at novel contributions in relation to two major societal OSH-related needs. The call for new innovations in all policies, including the development of working life and OSH, has since continued actively. In 2008, Matti Vanhanen's II Cabinet

launched Finland's national innovation strategy. The strategy aims at broad-based and multifaceted innovation policy and strengthening its implementation.

Key drivers of change in the Finnish society

Finland's Cabinet has identified four major key drivers of change in the Finnish society:

- *Globalisation.* Industrial manufacturing is very flexibly placed in locations offering the most favourable operating conditions. Knowledge and competence are undergoing similar development. Operators in developing countries are striving to challenge those who are presently enjoying success throughout the world.
- *Sustainable development.* Increasing awareness of climate change and the related threats has created pressure to adopt ecologically sustainable production and consumption. The scarcity of energy and raw materials, and their soaring prices, are adding to this pressure.
- *New technologies*. Technological development continues at an accelerating pace. For instance, the fields of information and communication technology and bio- and nanotechnology are producing information and results on a continuous basis, creating huge potential for new applications and the renewal of former operations.
- *Ageing of the population.* Finland is one of the first countries to face reducing workforce volumes. The rapidly changing population structure is forcing Finland to devise rapid solutions in order to enhance productivity and efficiency, while creating the preconditions for new innovations.

Trends in Finnish working conditions

A group of experts from the Finnish Innovation Fund (SITRA) has added two other major key drivers of change to the list. They are 5. *Increasing migration*, being related to globalisation, and the 6. *Structural trends in economical and industrial life*. Based on the key drivers of the society, SITRA experts predict the following major trends in future Finnish working life:

- open and network economy
- insecurity and insecure working places
- higher work demands
- longer working hours
- the increasing role of creativeness and innovativeness
- competition at work and for working places gets harder
- greater needs for the support of well-being at work

Past trends in work and OSH in Finland have been systematically followed by FIOH. FIOH surveys from 1997 to 2006 (special report on trends in Finnish working life) show that perceived work accident risks and exposures to physical, chemical and biological agents are still common among the employed. Perceived harm due to these exposures has not changed during the last 10 years, but the levels of exposure have decreased to some extent. The number of new disability pensions has increased during the last 10 years. The increase has concerned mainly pensions due to mental disorders whose share was 30 % of all new disability pensions in 2007. Also, the rate of long sick-leaves has increased accordingly. Another major cause of disability pensions is musculoskeletal diseases (34 %). The rate of work accidents has increased, mainly due to accidents in the construction industry. The major

occupational diseases in Finland are noise-induced hearing loss, repetitive strain injuries, and skin diseases.

In spite of high numbers of health risks, over 80% of Finnish employees feel that their physical and mental work ability is fairly or very good, and they don't suffer from any such disease which would affect work ability. The most common symptoms among the employed are neck-shoulder symptoms, fatigue and sleeping difficulties. Fatigue and the feeling of stress have decreased during the last 10 years, but sleeping difficulties have increased.

FIOH special report highlights the following general trends in the Finnish working life:

- dissatisfaction with the precariousness of the labour market
- immigration and its challenge to the managerial practices and workplace cultures
- polarisation in workers' attitudes with existing jobs
- pessimistic visions about long-terms trends in working life
- demographic changes among the working-aged population
- risk of a possible vicious circle due to depression and weaker public finances

At the moment, Finland is caught by the economic depression together with the rest of Europe and the entire global economy. Depression is likely to have profound influences on the quality of working life, resulting in increased uncertainties and heightened risks in both psychosocial and physical hazards at work.

Expert forecasts on emerging OSH risks

The European Agency for Safety and Health at Work has produced expert forecasts on emerging European OSH risks. Emerging OSH risks have been defined as any occupational risks that are both new and increasing. The European Commission within the ERANET program has also produced lists of emerging risks in OSH. The European Agency for Safety and Health at Work has identified the following emerging biological OSH risks:

- occupational risks related to global epidemics
- workers' exposure to antimicrobial-resistant pathogens
- occupational exposure to endotoxins
- moulds in indoor workplaces
- biological risks in the management of solid waste
- difficult assessment of biological agents in the workplace

The emerging physical risks were:

- lack of physical activity
- combined exposure to vibration and awkward postures
- poor awareness of thermal risks among low-status worker groups exposed to unfavourable thermal conditions
- combined exposure to MSD risk factors and psychosocial risk factors
- multi-factorials risks
- combined exposure to vibration and muscular work
- thermal discomfort

- complexity of new technologies, new work processes and human-machine interfaces leading to increased mental and emotional strain
- insufficient protection of high-risk groups (older workers, low status workers, foreign workforce)
- general increase of exposure to UV radiation

The top emerging psychosocial risks were related to the following five main topics:

- new forms of employment contracts and job insecurity
- the ageing workforce
- work intensification (high workload and time pressure)
- high emotional demands at work (including violence and bullying)
- poor work-life balance: long working hours and shift work

The EU has produced the following list of the major emerging risks in OSH (NEW OSH ERA):

- working environment preventing occurrence of psychosocial problems
- psychosocial risks associated with organizational changes
- combined exposure to multiple risk factors in the working environment including physical, chemical, psychosocial, biological and ergonomic issues
- changes in the world and employment conditions (forms of work)
- improving OSH management systems and safety culture

FIOH future challenges

Based on FIOH's initial self-evaluation, the strategic goals of the systemic and societal results have been pursued with good or excellent scientific knowledge, with good efficacy of the implementation process and with the use of relevant partnerships. The potential achievable societal impact of the strategic aims is high. Up to now, moderate impact is visible after the first two years of the execution of the 22 programmes. It is obvious that many of the initiated programmes, thematic areas and other research topics of the current strategy need longer time spans to fulfil their aims and to secure and support the initiated changes. Several of the strategic goals are also on areas that will probably be emerging risks in OSH in the future. The future strategic priorities and goals need, however, to be refocused and sharpened, in view of the rapidly changing environment and the ever-increasing complexity of the change.

FIOH has passed an intense organizational and functional change by changing to the ambidextrous matrix-like organization and by activelyl developing new R&D and service models. The several internal development projects due to these changes have been time-consuming and demanding for the organization. These programs need to be completed before new projects can be started. Maintaining bridges between the renewal and established activities, but at the same time allowing the renewal activities to be differentiated is a key.

FIOH's current strengths are related to its apparent high competence, multidisciplinarity, good connections to its stakeholders and social partners, innovative R&D, and good national and international networks. The strategy 2006-2010 has given the necessary booster for the organization's renewal. FIOH weaknesses are related to its needs to further improve the implementation of the obtained results, the ageing of the personnel and the high work load of

its key experts and managers. The biggest challenges and threats of the institute are related to resource fluidity, its ability to obtain appropriate distribution and competence of sufficient R&D&I personnel while executing its future strategic challenges.

Governmental productivity program

The Ministry of Finance formulates the general criteria on public administration development in Finland. To obtain structural reforms and increased productivity among public administration, the ministry has set goals for the decrease of personnel in all public sectors, including the governmental research institutes. To achieve the cutbacks required by the Ministry of Health and Social Affairs, FIOH needs to decrease its state subsidy-related posts by 28 persons by the year 2011. In addition, FIOH has been given the task of also cutting the number of its self-financed posts by 55 by the year 2011. Further cuts for the period 2012-2015 are being planned but not yet allocated.

The simultaneous need to cut the number of personnel with the need to acquire competence in novel areas is challenging, and requires great strategic agility. Up to now, FIOH has been able to cut the demanded subsidy-related posts by outsourcing personnel outside the core scientific competencies: real estate services, PC advice etc. However, outsourcing even these activities has increased the needs for higher income from its self-financed activities. In the future, in the situation of increasing challenges and decreasing personnel, strategic decisions are needed by outsourcing, reorganising or closing some FIOH activities in order to maintain the Institute's ability to focus on the future challenges in contextual R&D and in implementing the acquired knowledge.

4 Client services

Introduction

Purpose of FIOH's service according to its strategy (2005)

In short, the fundamental purpose of FIOH's fee-based specialist advisory services is to help its clients develop their products, working conditions and operations in general. FIOH focuses particularly on services that prevent health hazards and promote health and well-being. FIOH's aim is to reinforce a service model through which FIOH creates a functional solution together with the client. Through FIOH's service operations, FIOH learns about working life needs from its clients, and finds new challenging subjects for its research and development activities.

FIOH's services are in demand due to its familiarity with the needs of workplaces, their high quality and their pioneering reputation. FIOH is working to further improve its productization, client relationships, and the marketing of its services. FIOH's service production is based in part on long-standing client relationships with pioneering organizations in the field. In this way, FIOH hopes to promote the emergence of new service innovations. When a service innovation begins to spread, and demand exceeds its own capacity, FIOH actively seeks partners who can help spread the innovation even further.

Through FIOH's training, FIOH supports its clients' development of their own operations and solutions to problems they may encounter. In the field of occupational safety and health, FIOH's aim is to be the most highly sought after trainer of experts and instructors in working life. The training FIOH provides is of a high standard both nationally and internationally. FIOH develops and organises training that leads to competence and qualifications as contained in the Act on Occupational Health Services.

Through client news-sheets and publications (print and electronic), information services and meetings among others, FIOH provides information aiming at improvement of working conditions in Finnish working life. FIOH's information dissemination has also been very active and successful in its image marketing.

The development process of service activities in short (2006–2008)

FIOH has started the development of its service and client management in 2006 by arranging seminars with the Board of Directors and the Executive Committee. Then, FIOH has proceeded with those strategic decisions to an operative level. The schedule has followed FIOH's ability and capacity for changes e.g. according to the information process. But mainly, FIOH has proceeded and will proceed according to its original development plan (Fig. 4.1).

The development plan of FIOH's services for the period 2006–2010 describes the strategic goals for services, the current situation of services, the future challenges and development requirements for services of FIOH. The steering group of services was established, and it compiled the original development plan during 2006. While establishing and updating the development plan, the steering group of services followed the guidelines of FIOH's directors.

The service actions of FIOH have now been organised nationally. The strategic goal of this period is to strengthen both national and regional competencies by consolidating actions in Regional offices based on demand. Approximately 30% of resources focus on expertise services. The incomes should cover the expenses in service functions. The chargeable functions ensure that the supply of services and products of FIOH meet the clients’ needs.

In 2006–2007, the main goals of development were related to standardizing practices, managing client relationships, productization and also to devise the overall service supply. The basis of service elaborating in the future is to operate as a one-stop shop. In the view of generating expertise services, it is essential to create working networks and to invest in selected key clients and partners in the development phase of service products. The foundation of the service functions should be a well-productized national supply of services to meet the needs of FIOH's clients. The years 2008 and 2009 are the seasons of new principles and the time of implementing new Microsoft Dynamics Ax management system, which requires broad engagement and training. It is also a phase to search for new solutions regarding the implementation of service and client management.

The focal development actions during the year 2008 were:

- Concentrate the functions of the service steering group on content control, and improve the relationship between service functions and strategic goals; develop coherent formats and identify the clients’ needs, focus on the supply of services and assess service effectiveness,
- Implement product families, roles and responsibilities, and clarify the practices of the follow-up system in the service process,

- Enhance and disseminate good practices of the service system,
- Focus activities and clarify productization goals: develop, model and implement the concepts of the FIOH productization process,
- Upgrade the marketing action plan as a part of the service development plan,
- Enhance the structure and content of services – web pages,
- Make the revenues and expenses of services transparent, and improve the assessment of effectiveness with appropriate indicators,
- Incorporate the Microsoft Dynamics AX management system into services,
- Make better use of the work experience of service employees,
- Carry out market and competitor analysis.

The development of service management is regularly monitored. Three times a year, the Executive Committee carries out a strategic evaluation, with the Acting Director and Head of Services and Marketing acting as a rapporteur. The service steering group consists of team and regional leaders, doing its part towards supporting development.

FIOH has currently implemented all of its programmes (Fig. 4.1) and much work has been done to change from a regional-based to a nationally operating service system. The main changes have taken place in terms of networking and client segments (especially in the productization process), as well as in market assessment, the role of FIOH in the market and client feedback. A comprehensive client feedback system is now in place, ranging from feedback from individuals receiving services to the overall evaluation of its reputation in the market. In addition, FIOH is now in the process of expanding its agreements with its key clients, i.e. large towns and government institutions, and its partners, most of which are local universities. FIOH's clients are a major consideration in every part of the productization process, from research to service.

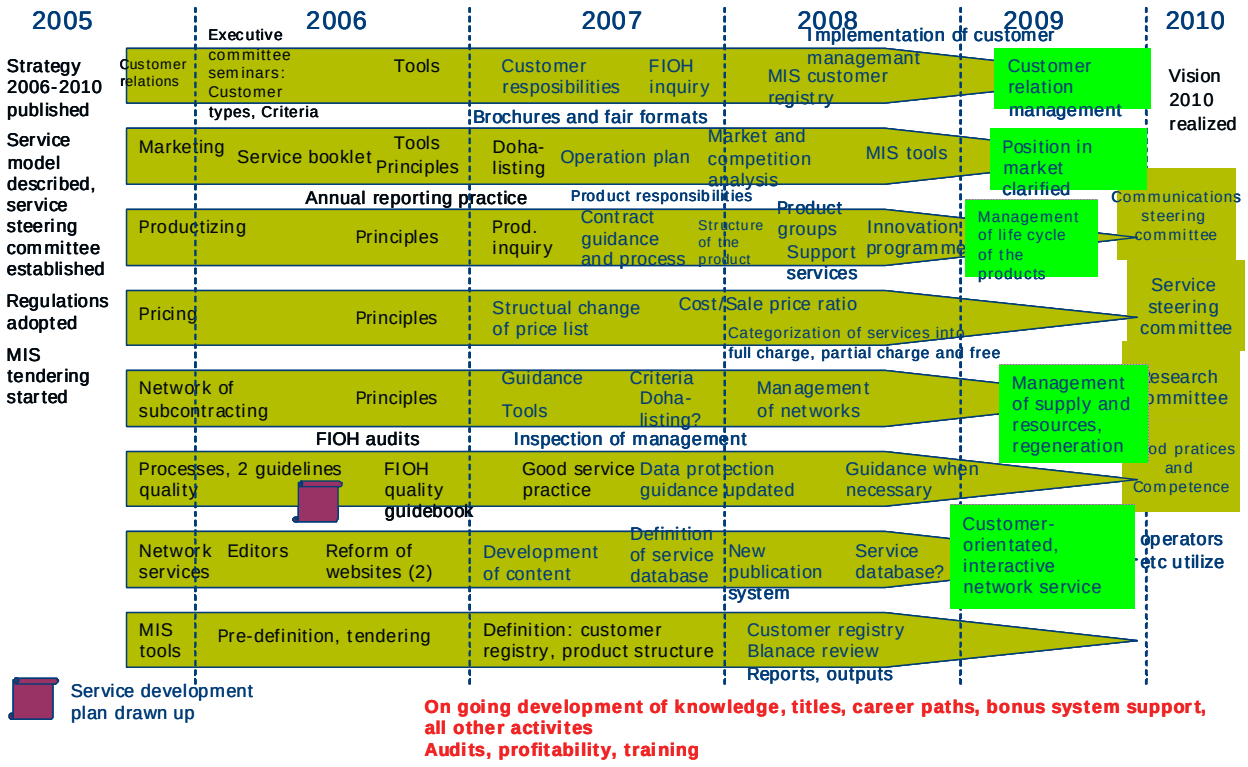


Figure 4.1. The 2005 planned development process of FIOH's service actions in 2006–2008.

Workshops and seminars have been arranged to discuss client service, productization, and information management systems and the attending experts have committed to the changes. Members of the service steering group have visited teams and regional offices to introduce decisions and report the results from the audits of the teams and the Centres of Expertise. Participants in these meetings have included FIOH Directors, Heads of Services and Marketing, and marketing experts. In addition FIOH has met its clients in many meetings and exhibitions. FIOH participated in 26 exhibitions, where visited 415 000 participants altogether.

The most important discussions right now, in terms of the development of FIOH services, concern the future role and content of the service, how it should be organized, the development of the product structure and CRM (client relationship management).

The image of FIOH

FIOH's aimed image in strategy is client-orientated, proactive, focused, highly skilled, a cooperative partner, regenerative and an exemplary workplace.

According to FIOH's Image-project 2005, FIOH should be reliable (”evidence-based”), neutral and ethical, a forerunner, innovative, practical and fair, take active responsibility, give a face to well-being at work and be useful through a network.

Now the image of FIOH is defined as follows: A forerunner among research institutions and a rehabilitator of working life. This means that FIOH is neutral and ethical, strictly health- and safety -orientated, skilled, quality activated, trust based on know-how and independence, anticipatory, well-defined (crystallized), clearly focused and continuously developing, client-oriented, interactive and effective, cooperative, ideological and a practical partner.

In the special report *Client and market analysis*, it has been concluded that FIOH has many successes towards achieving this aim.

Legislative basis (FIOH Act) of FIOH's services

FIOH conducts investigations, analysis and reporting work, carries out measurements and provides services related to the prevention and elimination of health hazards at workplaces and in working environments. FIOH carries out independent health care, medical care and laboratory work in order to diagnose, treat and prevent occupational and work-related diseases and to assess working capacity. FIOH engages in training, publishing and information activities related to its field and carries out other duties prescribed to it. In addition to the operations laid down in section 2, FIOH may produce health care services solely for another party; carry out studies related to its sphere of operations, personal evaluations and other investigation, analysis and reporting work and measurements related to its field; and store and use such data for the purposes of research and investigation, analysis and reporting work in its field, with the consent of the data subjects.

Description of FIOH's clients

FIOH has decided that it will collect client data according to the following segments in the future:

- Ministries and governmental organizations (including the EU)
- Sponsors
- Insurance companies
- Companies
- Hospital districts and hospitals
- Occupational health care organizations and occupational health centres
- Organizations and cooperative organizations of institutes
- Pension funds and institutes
- Universities and other educational organizations
- Municipal organizations
- Research institutes
- Cooperative associations
- Foundations
- Real estate (and housing associations)
- Internal clients of FIOH
- Private persons

FIOH will use this segmentation to list its most important clients at present, based on its economic data (Fig. 4.2).

The figure shows that FIOH's four largest client segments produce about three-quarters of FIOH’s income. The most important segments are companies (28 %), governmental organizations and the EU (25 %), hospitals and occupational health care organizations (15 %) and insurance companies (9 %). FIOH should offer these client segments its best services at all times, and this must be taken into consideration when arranging client meetings and disseminating information.

Because FIOH has just recently started to follow in more detail the activities with its client segments, it can soon analyse the situation. In the client distribution, there are no undesired distortions, but the segment of municipal organization should be better taken care of because of the large changes and problems in this segment which are developing. In the same way, FIOH has groups to develop activities with governmental organizations and employment groups. It also has partners and key client agreements with the most important research institutes and companies. The number of these agreements should be limited because of its limited resources.

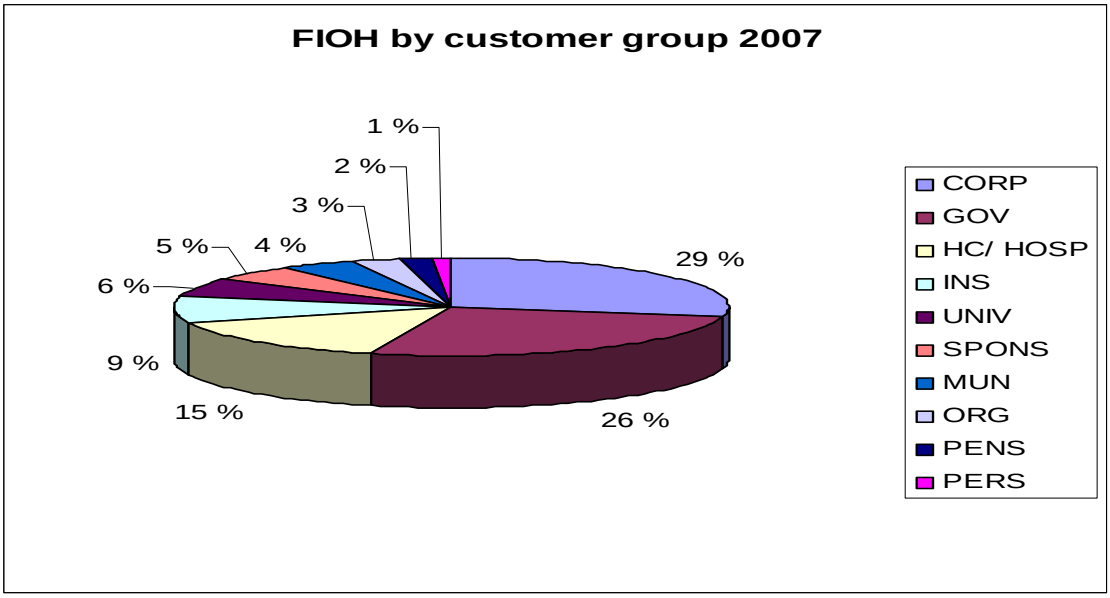


Figure 4.2 FIOH's income as distributed among its client segments, 2007.

CORP corporations
GOV governmental organizations
HC/ HOSP health care organizations, hospitals
INS insurance companies
UNIV universities and other educational organizations
ORG trusts, foundations, institutions
SPONS sponsors
PERS private persons
MUN municipal organizations
PENS pension funds and institutes

More detailed descriptions of FIOH's customerships and principles of client relationship management are in the special report *Client and market analysis*.

However, based on the comments of the international evaluation in 2004, development work was launched to identify the customerships and practices of the client relationship management and for consolidating them.

As a result, a genuine interest in client care, solid and ambitious collaboration with new types of selected partners and key clients, focusing operation, clarifying the roles of the operators, the effective implementation of internal and external cooperation and rational exploitation of distribution channels are all essential for ensuring and increasing the effectiveness. Effectiveness will be focused more consciously to desired client groups and client relations. That kind of client information will be collected in the future (2009-2010) by the new Joti system.

FIOH's service functions are divided into three categories, depending on their source of financing: client-financed, co-financed and budget-funded functions. Client-financed functions are operated in market-oriented areas, such as indoor air measurements (coverage 120 %). Co-financed are operated in uncontested market areas and due to the nature of the client, 100 % coverage of operation is not possible (coverage 50–80 %). Budget-funded services provide service to authorities, among others. The service function is compiled in the following way: client-financed 50 %, co-financed 32 %, and budget-funded 18 %.

The principles of client relationship management

The Executive Committee of FIOH defined the criteria and principles concerning client relationships in a seminar held in 2006. The concept of client was expanded, the types of client relations were specified, and the way in which different types of client relations are managed were defined, as presented in table 4.1.

Table 4.1 The principles of FIOH client relationship management

Volume of functions	**Character of the function**	**Character of the client**	**Character of client management**	**Immediate action**
20 %	Renewal, high-risk projects (units of excellence, problem-focused teams)	Client as a development partner, a pioneer	Collaborative development with clients who have the will and the resources	Establish a partnership agreement
50 %	Accurately-defined strategic goal (themes, teams focused on different client groups, networks)	Established key clients	Targeted client development, creating demand, enabling client relations (acquiring funding)	Construct a plan for taking care of the key client
30 %	Basic operation: statutory activity (among others), guidance on demand, preparedness (client-based teams)	Basic client, occasional client, standardized product	Follow-up, common product marketing	Operate according to principles of supply and demand

The FIOH service steering group, constituted at the implementation phase of the new organization, launched a work group to define practices of client relationship management, as based on the guidelines the directors of FIOH had given. In March 2006, the Executive Committee approved new criteria for selecting partners and laid out responsibility principles regarding key clients. They also specified what they feel are suitable positions and tasks for a person who is to be named responsible for client relations. The FIOH Executive Committee was determined to be responsible for strategic partnerships. The majority of FIOH clients are basic clients and the volume of basic operations is large; and so, therefore, it is a necessity that its regular functions manage these client relations well.

Client demand survey

The aimed impact of the survey was to gather information of client demands in the current situation and the development of the client demand in the future. The questions had been structured on the base of FIOH's product line in order to obtain useful information concerning the development of the product lines. The survey was implemented by reviewing occupational health care nurses in charge (target group 100 person) and the representatives of companies in different industries (target group 400 person). The survey was carried out by FIOH’s CATI unit between autumn 2007 and spring 2008.

According to the results of the survey, well-being at work is intensively linked with the success of the workplace and the significance of the well-being is expected to remain the same or to grow during the next years. The concerns in the workplaces are among others:

ageing, competence development, commitment of human resources, labour shortage, hurry and stress, constant change, challenges of globalization, welfare of the workforce and tightened competition.

In the view of well-being at work, representatives of the workplaces expect that investing in

1) improvement of the processes and methods of work (ergonomics of the work equipment, usability, working time, control of change in work, improvement of work processes): grow 65,8%, remain the same 33,2%
2) improvement of working environment or working conditions (health risks and hazards relating chemicals, indoor air measurements, dust and fibre, noise, vibration, radiation, lighting, temperature, improvement of health safety at work, measuring and biomonitoring chemical exposures, risk assessment, REACH): grow 63,8%, remain the same 34,7%
3) improvement of management practices (development of management and leadership, supervision of work, safety management): grow 72,4 %, remain the same 26 %
4) improvement of the work community's functionality (development projects and changing processes, atmosphere surveys, settling of conflicts and problems, successful recruitments, competence development, personal assessment): grow 76,5 %, remain the same 21,9 %

If client workplaces of occupational health purchase services regarding well-being at work, they will acquire well-being at work services from occupational health care (88 %), through their own system (40 %), by using consultant (14 %).

Of the representatives of workplaces, 10 % announced they'll contact FIOH next time they need services relating to well-being at work; 46 % of occupational health care nurses in charge would do the same.

Client satisfaction and feedback analysis is in the special report *Client and market analysis*.

Product lines and productions

Organizational reform at FIOH is based on the principle of knowledge-based resources, developed to eliminate unnecessary repetitions of past activities. During spring 2007 and autumn 2008, FIOH systematically constructed an integrated product information model that was completed in the autumn of 2008. In the product information model, the current products are divided into seven product lines, which are further divided into product families (Table 4.2.).

Table 4.2 Product lines (7) and product families (40) and examples of products.

PRODUCT LINE TRAINING	
Product families	**Example of products**
Internal training support services	Training assistant services
Seminars and conferences	Occupational Health Days, Studia Generalia
Development of work processes and methods	Ergonomics and usability, Job hours and cognitive ergonomics
Development of occupational health and work ability	Occupational and work-related diseases, Competence training for OHS professionals
Development of work communities and organizations	Development work and well-being of the work community
Development of work environment	Risk Assessment, Development of occupational safety

PRODUCT LINE ORGANIZATIONAL DEVELOPMENT SERVICES	
Personnel assessment and competence development	Aptitude assessment
Development of work organizations	organizational climate surveys ParTy
PRODUCT LINE COMMUNICATION	
Books and periodicals	text books, handbooks
Public relations and communications	annual report, fact sheets
Internal communications	intranet, email, personnel magazine
Web and library services	-
PRODUCT LINE OCCUPATIONAL MEDICINE SERVICES (OMS)	
Occupational skin diseases	Dermatological evaluation and skin testing of suspected occupational disease
Pathology of occupational diseases	Asbestos fibre analysis of lung tissue
Specialist training for physicians	Six-month FIOH Occupational Medicine education period for physicians specializing in OHS
Assessment of human functional reserves	Cold and heat load assessment
Occupational respiratory diseases	Clinical evaluation of suspected occupational rhinitis, asthma, alveolitis or asbestos disease
Nervous system diseases and cognitive performance	Clinical evaluation of toxic encephalopathy or vibration disease
Nursing and support services	Nursing, assisting and clinical equipment services at FIOH outpatient clinics and ward
Evaluation of noise-induced hearing loss	Medical expert reports on hearing loss
Evaluation of other occupational diseases	Evaluation of any other occupational disease than the above mentioned, e.g. non-asbestos occupational cancer
Work ability and rehabilitation assessments	Evaluation of functional capacity and work ability in psychiatric, cognitive, somatic or multisystem disorders
Medical and expert services in occupational medicine	Specialist (Occup. Med.) and industrial hygienic expert services for Occupational Medicine Product Line
Occupational medicine services for workplaces	
PRODUCT LINE WORK PROCESS AND EQUIPMENT DEVELOPMENT	
Ergonomics and usability	Support to workplace planning
Working hours	Working time planning and shift work schedules
Mastering of work change	Change workshop
Improvement in occupational safety	TUTTAVA-, Elmeri- and TR-methods
PRODUCT LINE OHS DEVELOPMENT AND HEALTH AND WORK PROMOTION	
Promotion of Work Ability and Health	POTENTIAALI
Evaluation and development in OHS	AIKA-AVAIN
PRODUCT LINE WORK ENVIRONMENT DEVELOPMENT	
Biomonitoring services	Biomonitoring
Emission and thermal degradation control	Material classification tests, thermal decomposition tests of materials
Physical hazards prevention	Noise and vibration management
Chemical analysis services	Metal analysis
Chemicals and dust nuisances Management	Asbestos analysis, Chemical and dust exposure assessment
Microbiological and Immunochemical analysis services	Antibody analysis, microbial analysis
Dust analytical services	Electron microscope research and analysis services
Risk Assessment and Safety Management Services	REACH
Indoor air services and microbiological hygiene	Indoor air survey
Testing and certification services of personal protective equipment (PPE)	Testing of PPE, lasers and noise emissions and vibration of machines Certification of PPE

Products belonging to each product family are then further divided into various title groups. Future profitability will be monitored according to level, i.e. institution, product line, product family, and title group. The Directors of the Centres of Expertise will operate as product line managers, and product families and title groups will have corresponding persons with managerial responsibility. In 2009, FIOH will adopt a new system of product line reporting, replacing the current practice. This new reporting system will also extend to client and market analysis, which has been very modest to date.

This entire process is managed by the steering committee of services, which makes strategic draft resolutions to the executive committee.

Most important statistics - resources and incomes

Service activities amount to 34 % of the total functioning in 2007 (35 % in 2006). Working time used for services free of charge was amounted to 18 % of the total working time (2006/2007: 11 %). Tables 4.3, 4.4 and 4.5 show a detailed use of the working time.

Table 4.3 shows the income from service activities at the institutional level. The income from services was 12.3 million Euros, which amounts to 105 % of the budgeted income. Income en bloc accrued from the services has been good.

Contribution margin from the chargeable service activities was in 2007 slightly over 100 %, when comparing total income (13.626 million Euros) with costs (13.567 million Euros). In 2008, the situation was similar.

Table 4.3 Service income on institution- and Centre of Expertise -level (amounts 1 000 euros) during years 2007–2008

	01-12/ 2007 realized	**01-12/ 2007 budgeted**	**01-12/ 2007 realized %**	**01-12/2008 realized**	**01-12/2008 budgeted**	**01-12/2008 realized %**
Services/Whole FIOH	**11136**	**10970**	**102**	**12255**	**11690**	**105**
Good Practices and Competence	366	308	119	327	401	81
Human Factors at Work	508	662	77	456	634	72
Internal Services	176	132	133	171	142	120
Health and Work Ability	3097	3318	93	3415	3443	99
Work Organizations	1065	1551	69	1271	1445	88
Work Enviroment Development	5923	5000	118	6616	5625	118

In a number of specialist advisory services, there was no increasing during 2008. The focusing of FIOH's service activities, the development work done to the JOTI system and the increase of FIOH staff have stopped the increase of the figures. Table 4.4 shows a list of the number of different advisory services provided during 2003–2008.

The proceeds of the Centres of Expertise vary notably. The proceeds of the teams vary a lot in all Centres of Expertise. The teams Occupational Medicine, Chemical Agents and Bioaerosols and Indoor Air earned over 1 million Euros.

Table 4.4 Person years of service activities on 2004–2008 (unproductive work not included).

Focus area	**2004**		**2005**		**2006**		**2007**		**2008**	
	%	Person year	%	Person year	%	Person year	%	Person year	%	Person year
Chargeable service activity	**83**	**211**	**81**	**176**	**79**	**175**	**79**	**172**	**75**	**152**
work and organizational psychological service	12	30	9	20	10	22	10	21	5	24
occupational medicine service	28	72	20	44	22	48	22	48	22	45
extensive working ability activities and development projects of occupational health care	3	9	4	8	2	6	2	5	2	4
occupational hygiene and toxicological service	32	82	36	78	34	75	34	75	37	76
work safety development service	4	9	7	15	7	14	7	16	6	13
ergonomics service	2	4	4	8	3	6	5	5	1	3
occupational physiology service	2	4	1	3	2	4	2	2	1	2
Non-chargeable service activity	**17**	**43**	**19**	**40**	**21**	**46**	**21**	**39**	**25**	**51**
development of service methods and quality control	7	17	10	22	10	22	10	15	7	15
non-chargeable expert service	10	26	8	18	11	24	11	24	18	14
Total	**100**	**254**	**100**	**217**	**100**	**221**	**100**	**211**	**100**	**203**

Table 4.5 Services produced by FIOH during years 2004–2008.

SERVICE	**2004**	**2005**	**2006**	**2007**	**2008**
Psychology of work, organizational psychology					
Development and consultation projects	252	223	160	123	154
Health-clinical-psychological individual surveys	53	51	53	42	28
Selection assessments (number of persons assessed)	1 076	1 030	1 477	790	731
Occupational medicine					
Patients examined	4 225	2 428*	2 219	2 162	2 061
Patient examination and treatment consultations	6 468	5 885	5 194	4 436	4 133
Suspected occupational diseases examined	2 372	1 786	1 894	1 978	2 206
Occupational diseases diagnosed	660	591	486*	488	549
Statements of a person's work ability	324	497	443	374	318
Extensive work ability and occupational health care					
Extensive workplace health promotion service projects	73	118	3*	-	-
Other cross-functional service projects for workplaces	156	151	1*	1	1
Development projects for occup. health service units	36	48	-	2	7
Industrial hygiene and toxicology					
Specialist opinions on occupational hygiene and toxicology, results of measurements and reports	1 371	1 255	1 508	1 396	1 306
Analysed industrial hygiene and toxicological samples	28 013	30 145	41 692	40 188	39 704
Analysed biochemical samples (number of samples)	14 970	12 641*	12 142	12 452	12 856
Occupational hygiene and toxicological samples in research, development of methods and quality control	22 986	8 941	1 560	2 151	2 252
Occupational safety					
Development and consultation projects	15	53	32*	64	34
Test reports of personal protective equipment and for machinery and equipment	341	392	349	461	350
Certificates for personal protective equipment and for machinery and equipment	317	294	319	395	406
Ergomics					
Development and consultation projects	20	41	29*	24	20
Occupational ophysiology					
Physical work capacity measurements (number of persons examined)	2 707	2 608	3 803	3 114	7 577

In 2007, the situation of service was historical in many ways. Noticing in the calculation FIOH's total service income (13 million Euros), the service balance was 100 %.

Services developed contentually well, and development discussions of new products have been positive, and it helps the development of service impressiveness and productivity. By productization product innovations have also increased.

It's also been an historical situation in the development of the service process. In the years 2007-2008 or its process functioning and productivity, it's at least comparable to other core activities. FIOH has developed methods for client, cost, marketing and productization managements. Partly, with the support of JOTI, FIOH's product thinking and responsibilities were well realized in the beginning of 2008. The clarification of product structure also develops FIOH's website and liability distribution.

FIOH's quality control system

The quality system of FIOH is documented in the FIOH Quality Manual and in FIOH level instructions. The quality system of the Centre of Expertise for Work Environment Development (CEWED) is a part of the FIOH quality system. The documentation of FIOH and CEWED comply with the following hierarchy:

- Guiding principles, laws and norms
- FIOH Quality Manual
- FIOH directions
- FIOH procedure instructions
- FIOH work instructions
- FIOH forms
- CEWED Quality Manual
- CEWED procedure instructions
- CEWED work instructions
- CEWED forms
- Team level procedure instructions
- Team level work instructions
- Team level forms

The FIOH Quality Manual is maintained by the Head of Services and Marketing, and the changes are accepted by the Director General. The CEWED-level Quality Manual and the CEWED-level procedure instructions are maintained by the CEWED Head of Quality Control, and they are accepted by the Director of the Centre of Expertise. Lower-level documents are maintained by nominated people in charge. The team-level documents are accepted by the Team Leader or by a person authorized by the Team Leader.

FIOH-level documents are available for the personnel on the intranet. The CEWED- and team-level documents are available for the CEWED personnel in the Document Management System.

In 2007, the Centre of Expertise for Work Environment Development became an accredited testing laboratory. Before that, there were seven different accreditations in the Centre of Expertise. Before the combined accreditation decision, the management system of the Centre

of Expertise was assessed by FINAS (Finnish Accreditation Services), and a quality manual and procedure instructions were written and implemented. At present, the common quality documentation consists of the CEWED Quality Manual and instructions for:

- Document writing and supervision
- Internal audits
- Collecting and handling of client feedback
- Referring to accreditation in testing and other reports

The Centre of Expertise arranged a course of internal auditing in spring 2008, at the same time when the instructions for internal audits were published.

A common model of occupational hygiene reports has been presented. The model is ready for use although there are still some terms awaiting decision by the Executive Committee for their definition.

In addition, relating to team development discussions, team audits are performed annually. The team audits take place in spring after the approval of the teams' annual reports. So far, the team audits have concentrated on how the teams have obeyed the institute's common instruction and procedures, but during the year the audits will be directed from compliance audits more towards performance audits. The CEWED Head of Quality Control has held management reviews with those teams who have accredited activities. The whole Centre of Expertise has been audited annually by the Centre of Expertise for Internal Services. The accredited activities have been audited by FINAS every 1-2 years with 4 to 8 annual visits. The teams perform their audits according to their own auditing schemes.

The scope of accreditation covers 30 biomonitoring analyses, 11 chemical, biological and aerosol methods. The accredited scope of physical testing covers over 140 testing standards, including personal protective equipment (PPE), lasers, sound absorption and sound reduction of building materials and elements, and noise emissions and vibrations of machines.

A method of evaluation of the effectiveness of training actions taken has been taken into use. The aim of this evaluation is to ensure the appropriateness of training and to help good practices to spread in the whole Centre of Expertise.

In the future, the sampling process will be an accredited activity in all regional offices. The state of the technical operating environment provides possibilities to improve FIOH's services to become more client-oriented.

Delivery times

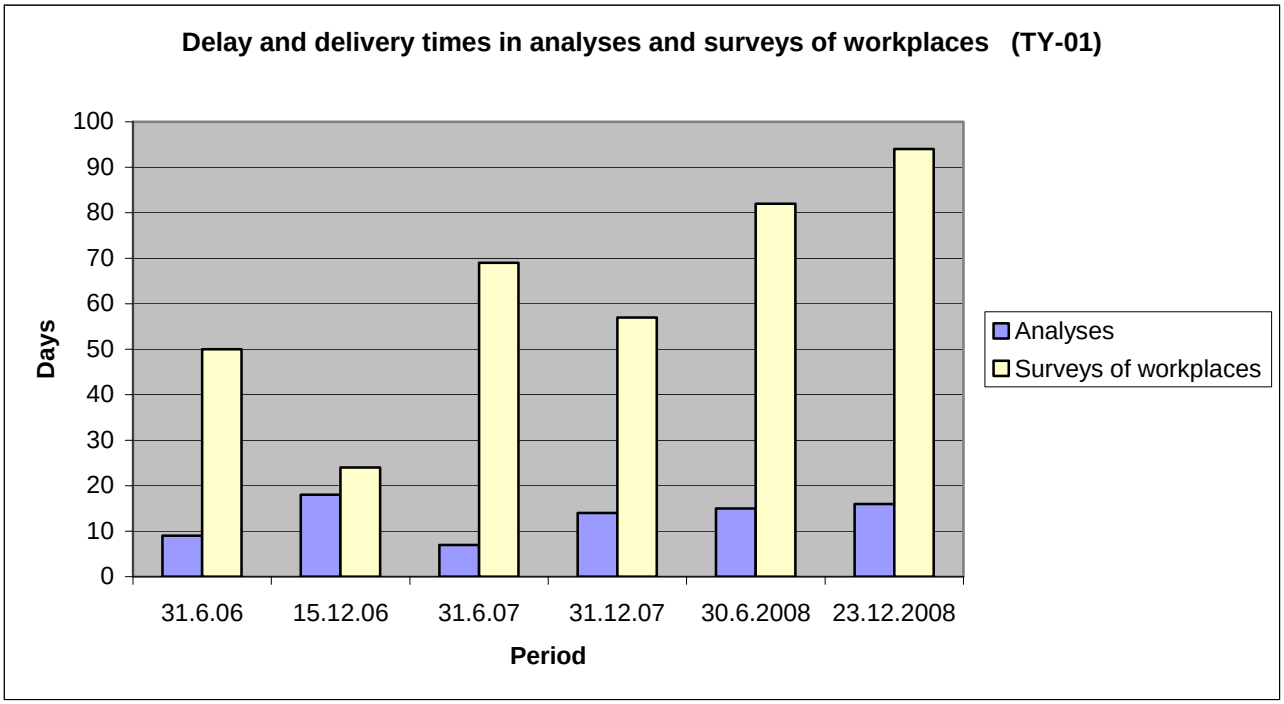
On the grounds of client feedback, it was agreed in the year 2007 that the delivery time for occupational hygiene surveys is 6 weeks and for analyses in the laboratory 2 - 4 weeks. These times include the time from the visit for making the measurements to writing the report/invoicing. In the year 2008, the 6 weeks delivery time was exceeded in 50 occupational hygiene surveys (20%). This nearly equalled the amount of complaints about minor or major delays in the client satisfaction query.

The time of delivery for laboratory analyses was 4 weeks on the average (median 16 days). The delivery time for asbestos and mineral fibre samples was 5 days (median 3 days) and the

four-week delivery time was exceeded in 12 cases (4 %). The reason for this was that the rarest analyses cannot be performed every month.

The most essential causes for delays have been annual vacations, (between the measurements and the writing of the report), delay in the laboratory analyses, or there has been an agreement on longer delivery times due to, among others, sick-leaves, backlogs or problems in controlling working time or in time management.

Figure 4.3 Delay and delivery times in analyses and surveys of workplaces (TY01).



Client satisfaction concerning delays will be taken care of in the future by the following measures:

- Exceeding of delivery time always requires agreement with the client and completion of the non-conformancy form.
- The delivery times and delays must be systematically monitored (JOTI)
- In the regional field coordination meetings, the list of orders is always checked, and if the agreed delivery time seems to be exceeded, corrective actions will be agreed upon together.
- With these actions, FIOH exceeded delivery time in only less than 10 % of the orders in 2009

4.1 Organizational development services

Overview

Organizational development services help workplaces to create a more efficient work force, better social climate, more functional work processes and better well-being for personnel.

Workplaces learn to develop their processes and learn to improve work organization. With its service activities, FIOH efficiently promotes the implementation of research and practical knowledge in the Finnish working life.

The main goals of FIOH's organizational development services are to help organizations to manage their human resources successfully as well as to promote healthy and innovative organizational practices and climate. FIOH's clients and partners are public and private workplaces, occupational health service providers, OD experts and management. FIOH has no legislation-based roles in its service activities.

FIOH consults organizations in their personnel assessment and selection, in developing their recruitment skills and promotes recruitment process. In FIOH's training activities for management, HR-experts and supervisors, FIOH emphasizes ethical transparent recruitment processes. The product family "Personnel Assessment and Competence Development" is well established in Finland and has a good reputation. Its roots date back to the beginning of the 1950s. In Finland, we are the sole provider of a training programme for psychologists, consultants and HR-experts, which entitles to the "Certificate of Personnel Assessments". The Personnel Assessment and Competence Development product family employs six psychologists.

The most successful change in FIOH's service delivery was the establishment of a "Work organization development team" and the Development of Work Organizations product family. It offers OD services throughout the entire country. In that way, the Centre of Expertise has two service teams, which enables more focused service product development and more economically effective service processes. At the same time, the competence training of FIOH's own OD consultants has also become more target-oriented at the individual level.

FIOH's Development of Work Organizations product family is focused on work organizations. The aim is to deliver valid research-based organizational climate surveys either directly to workplaces or via occupational health care providers. The occupational health psychologist in municipal and private OHS units can make an agreement with FIOH to use of its scientifically validated work climate survey methods, based on its own or collaborative research with other Scandinavian research institutes.

FIOH has improved the practical usefulness of its work climate services to work places by organizing training course for supervisors and management to benefit the survey results. A guide book for utilizing the survey as a tool for developing organizations will be available in 2009, aimed specifically at supervisors. FIOH is also developing a data analysis program for the survey method. FIOH has developed a special version of the Nordic questionnaire survey "QPSnordic for elderly employees" with its Nordic partners. This is in concordance with the recommendations of the earlier international evaluation of FIOH (Recommendation 60).

Organizational interventions, process consulting, and training services are always tailor-made processes for individual work organizations. Consultation and helping workplaces in conflicts and crises are FIOH's important services for its clients.

In order to implement FIOH's own and new international research findings into practise, new service products are being developed by creative processes. FIOH has completed the renewing of its Healthy Work Organization Questionnaire in order to better correspond to the current state of Finnish working life.

The new organizational survey method ParTy (Towards a Better Working Community) has been taken into use, and the "Job engagement" training and consultancy service product is under development. It will be a systematic and well-structured method based on positive psychology which is a new kind of service product on the market.

Planned resource input and profitability 2009

The Development of Work Organizations product family has as its personnel resources 13 organizational consultants. With these activities, we earn annually about 900 000 Euros. In future, it is possible to sell also licenses for external users of this work climate survey method.

The Personnel Assessment and Competence Development product family has a total of 10 persons: 5 psychologists, 3 assistants, 1 R&D-psychologist and a team leader. In 2009, the financial goal of the product family is 615 000 Euros.

In the Organizational Development Services product line, the main client groups are public administrations (ministries, departments and institutes), private enterprises, associations and research institutions. FIOH's psychologists and organizational consultants are in direct contact with their clients: organization management, HR-experts and supervisors. In addition, FIOH distributes its expertise by training consultants, HR-experts and supervisors as well as through publications.

Statistics

Use of resource and profitability

1. Personnel Assessment and Competence Development 10 person years/year
2. Development of work organizations 13 person years/year

	2006	**2007**	**2008**
Personnel assessment	1 477	790*	731*
Work Climate Surveys	33	31	54
- total number of employees/ number of respondents	15 349/ 12 375	12 720/ 8 553	17 390/ 7 846
Organizational development projects	74	69	66
Training courses	35	30	20
Training hours	556	450	600

Table 2. Development of organizations service activities in 2006–2008.

*The Personnel Assessment and Development product family has developed new service products during this period. Other products are (larger) recruitment services, coaching, training services and a turnover questionnaire service product, which explains the decreasing number of personnel assessments.

Product families

1. Personnel Assessment and Competence Development, e.g. service products are personnel assessments, coaching, recruiting services, turnover questionnaire.

2. Development of work organizations, e.g. service products are organizational climate surveys ParTy, Process consulting and Organizational interventions, Training service and Consultation, helping in conflicts and crises.

Focal product

Aptitude Assessment

Aptitude assessments are an important part of human resources management. An organization’s success is based on capable personnel. This means that hiring good-quality personnel, as well as developing and training them, is essential.

Aptitude assessment refers to evaluating and predicting a person's aptitude for a job, task or training. It systematically assesses and measures one's personal traits and abilities and also predicts a person's aptitude for a specific job or task. Using an expert from outside the organization as an assessor benefits both the organization and the job applicant / candidate. In FIOH, assessments are made for specialist, supervisory and international positions and for other jobs involving special requirements. We specialize in e.g. expats, pilots and firemen.

Scientific basis of product

Wide scientific research gives evidence of a connection between personal traits and abilities and work performance. FIOH has one of the longest histories in aptitude assessment in Finland (since 1951). The long history of experience allows FIOH to constantly monitor and develop the validity of its methods and processes. FIOH uses multi-method assessment, which is the most reliable assessment practice based on scientific research studies.

Product concept and added-value to client

By using the product, the organization improves its productivity as well as competence and well-being of human resources. The results benefit both the organization and the individual. The results are available for recruitment decisions, during the induction period and in human resource development. The organization gets adequate, competent and efficient employees. When an employee works in a task and environment that suits him/her, he/she is both productive and possesses good well-being. The expertise and quality of the product and services are high-class; FIOH's psychologists are highly experienced. The product also strengthens the employer image of the client organizations. FIOH co-operates with its clients in confidential partnerships and seek together new solutions and approaches to develop the client organizations. FIOH also offers additional consulting and wider expert services of FIOH to its clients.

Marketing Position

FIOH has long-lasting and close client relationships with its main clients in focused areas (in state administration, airline companies and fire service). FIOH has a skeletal agreement of governmental personnel assessments of management and supervisory-level tasks (Puitesopimus valtionhallinnon esimiesten ja johdon arvioinneista) (2007-2010). In Finland, personnel assessments are widely used and there are several consultants in the field. There are

no exact statistics of psychological assessments in Finland. FIOH's position is, however, different compared to commercial consultants. FIOH promotes the best practices. FIOH does research and development on assessment methods; FIOH contributes as experts in developing the assessment standards in Finland and internationally. In Finland, FIOH is the sole provider of a training program for psychologists, consultants and HR-experts, which entitles/leads to the "Certificate of Personnel Assessments". FIOH's quality is widely recognised.

Distribution model

FIOH's psychologists are in direct contact with their clients: organization management, HR-experts and supervisors. In addition, FIOH distributes its expertise by training consultants and HR-personnel.

Connection to strategy

FIOH's services are adding value to client organizations and other partners. FIOH promotes innovative, regenerative and healthy personnel and organizations. Well-fitting and well-functioning staff gives basis to the success of organizations.

Focal product

Parempi Työyhteisö® (ParTy®) -kysely/Towards a Better Working Community Survey

FIOH offers a reliable and understandable working climate survey which is practical and effective when conduced as a part of a development process. The survey is offered as a service for different types of organizations in Finland. A license for use will be offered for occupational health service providers to distribute the method and to collect more reference material. The license will be launched as soon as the IT-software is completed.

Scientific basis of product

ParTy Survey:

- Consists of themes that are based on theories of work-related stress and organizational behaviour, and on the concept of a Healthy Organization
- Is further developed from the THB (Työilmapiiri ja –hyvinvointibarometri) Survey, based on new research and client feedback
- Includes questions that have been selected based on their relevance and importance to the productivity of the organization and the well-being of the employees
- Is designed to work as a tool to asses the organization's current situation, make the strengths and areas of development visible to all, select development areas, and follow the changes by repeating the survey in 1-2 years.

Product concept and added-value to client

Services for organizations:

FIOH has many clients who conduct the survey on a year-to-year basis. As the questionnaire is built up by clear themes, it makes the survey flexible. This way, it suits many needs regardless of the field an organization works in, and is easily modified to suit the changing needs of each organization in the future.

License

The method will be offered for use to occupational health service providers. A timetable for launching the license is not certain as the IT-software is not ready.

There is a definite need for a tool like this especially which includes the IT-software for collecting and analysing the data. Many occupational health service providers and pension insurance companies have already contacted us regarding the method.

Market position

Mostly due to the balance between demand and resources, there has not been active client acquirement. New clients have been gained through word-of-mouth and visibility in the HRD events. The demand has somewhat increased during the past years. FIOH is seen as a reliable and good partner in conducting surveys and supporting development actions. We are known both in the public (especially the heath care providers) and the private sectors.

Connection to strategy

FIOH's message to the organizations is:

- Well-functioning working community is fundamental for well-being and productivity
- Changes are part of everyday life at work; the ability to function and renew the way things are done is an important asset to any organization
- To have committed staff is vital and requires a working climate where people feel they are really heard and able to participate.
- The ParTy Survey is a good tool to give staff the opportunity to be heard and to get involved in developing the organization they work in. It offers a good way to find areas where the organization could develop in order to increase the well-being and functionality of the organization. The survey process supports continuous development, not just conducting the questionnaire survey.

The ParTy Survey has been developed based on consultant's experiences of conducting surveys, client feedback and the latest research results of the themes that promote well-being and functionality of organizations. It is a good example of product development that FIOH promises to deliver.

Future challenges and plans

The competition on the market is high. FIOH is well known in the field of occupational health, but in companies it varies on how they know FIOH. FIOH can provide services in whole Finland. FIOH's brand is good in generally, but it must be still cleared. In future FIOH's services will concentrate more to the product support of its new products which its partners will use widely. FIOH is asking and observing the needs of its clients and developing new methods together with researchers and pilot organizations.

Self-evaluation

All FIOH's products have had good market position already for some years. The feedback of its clients has been good. FIOH is training its personnel continuously to deliver these services in client-oriented way.

On product line level FIOH's own evaluation is (++) good. Both product families have been active in improving their service processes and asking systematically feedback from their clients. The Personnel Assessment service is very well established in Finland (being the oldest unit in Finland, since the foundation of FIOH.) Their recent achievement is becoming the sole trainer for the "Certificate of Personnel Assessment". The other product family has invested a lot to the training of their consultants and developing new work climate survey methods and new organizational development processes. This means that their market position is good, quality of service products high and updated, which reflects their ability to renew.

4.2 Work process and equipment development

Overview

The main goal of the services in the product line is to improve work processes, operations, equipment, and work arrangements of FIOH's clients to prevent health and safety problems. The means are ensuring compatibility between human and work, applications of physical and cognitive ergonomics, application of occupational safety methods, suitable working time arrangements, and mastering of changes in work. Often FIOH tries to change normal work routines to include consideration of health and safety, and fluency. The best actions are done in the design of work processes and equipment, and during changes and development of work.

Each product family has different emphasis in clients. The main groups are occupational safety personnel, managers, and planning personnel in organizations. Co-operation is done with occupational safety and health care personnel. Occupational safety experts and health professionals use FIOH's products and methods, and thus they are increasing its influence in Finland, but royalties are not used.

Most of the service work is done in projects, which may last several months. FIOH's working time varies from one day to several weeks. Therefore, a smooth workload is difficult to achieve. The services may include training, consulting, seminars, analysis of work problems, sketching of solutions, introducing information systems etc. The service products are only partly standardized; most projects are tailored according to clients' needs.

Planned resources in 2009

The planned resource input in 2009 is about 9.5 person years (without training services). The planned profitability of the service work with clients is over 100 %, but because some expert services are given e.g. to authorities free of charge, the calculated value is lower.

Development actions 2006–2008

Some organizational changes have been made in the Centre of Expertise *Human Factors at Work* in order to develop the services. In 2006, a service team was started and it covered many of the knowledge areas of the production line but had thin resources. After one year, the service team was cancelled, and the personnel moved to the substance teams. From the beginning of 2009, the occupational safety team was split, and a service team was formulated. It covers services linked to safety information systems for companies, safety improvement methods and the Zero Accident Forum. The aim of this organizational change is to strengthen the occupational safety services.

Most R&D and commercial services are carried out in real or simulated work situations at real workplaces. That has made it possible to give up some laboratory rooms. Knowledge and competence of products has been spread among personnel so that more persons can handle client projects.

Statistics

The figures are based on data from the Centre of Expertise *Human Factors at Work*, which is near the product line "Work process and equipment development"

	2006	2007	2008	budget 2009
Service incomes * 1 000 €	611	508	455	564
use of resources ** human years	10	9	***	9,5

* in addition, commercial service is done as training or is classified as development projects
** use of resources is calculated based on project classification in PATU (not very precise)
*** not yet available

The profitability of commercial service is 100 %. The profitability of the whole service is about 75 %, because some service is done free of charge with state budget money (e.g., for the authorities).

Product families

The product line "Work process and equipment development" includes the following families:

- Ergonomics and usability (e.g., support to workplace planning and product development, evaluation of cognitive ergonomics)
- Working time (e.g., working time planning and shift scheduling)

- Mastering changes in work (change workshops)
- Improvement in occupational safety (e.g., safety information systems, TUTTAVA-, Elmeri- and TR-methods, Zero accident materials)

Focal product

Promotion of ergonomics in product development

The service offers clients the ability to exploit the ergonomic expertise of FIOH in their own product design processes. The scientific basis of this product is on epidemiology and ergonomic research and on the knowledge derived from these disciplines: knowledge of human physical and cognitive abilities and loading responses in various work systems, as well as measuring systems of human reactions and preferences. In projects, international ergonomic standards are used as design guidelines whenever they are applicable.

The product concept is to attach ergonomics to a product development process as a particular set of ergonomic methods and procedures. By incorporating the ergonomics as early as possible into the development process, the product will have better ergonomic features and usability. With these qualities included in their product, the client will have a competitive advantage. The concept also includes that we help to link financial assistance from the public financiers (Finnish Labour Protection Fund, Tekes) to clients.

FIOH is the market leader in this service in Finland. This position is achieved with the broad theoretical and methodological knowledge in ergonomics, its applications in real work systems, and with the ability to transfer this knowledge into the practical guidance and real life solutions.

FIOH focuses on the products used in working life. Various products and application areas in which design or ergonomic evaluation projects FIOH has participated in include e.g. laboratory work tools (i.e., pipettes, biological safety cabinets, chair and cart for blood sampling); healtcare work tools and workstations (i.e., mobile terminal, shower trolley, childbirth, analysing workstation of X-rays, clothes of disabled); police work (i.e., police cars, seats, duty belts); protective clothing; construction work tools (i.e., welding torch) and accessible housing (i.e., bathroom, kitchenette).

FIOH's clients are limited and public companies, both domestic and multinational. Some of the clients are international market leaders (among others, ThermoFisher Scientific).

Clients who utilize this service get reliable information about the functionality of their products or even about early product ideas in real work tasks and work environments. By combining this research-based information into the design process, they are able to design and produce products with good usability and ergonomics. FIOH is able to choose methods and procedures according to the clients needs and more importantly, according to possible financial or time restrictions in the ongoing design process.

The promotion of ergonomics in production development is directly linked to strategy. The services in this area are one of the outcomes in the programme *Promoting human-centred design.*

Results of the service product are also utilized in other areas of FIOH's innovation model: The results have been distributed by FIOH education, client connections, and internet pages (www.ttl.fi/ergonomia). The results have also been published in scientific journals, professional articles, and scientific conferences.

Focal product

The Change Workshop method

The Change Workshop method has been developed by combining theoretical (Activity Theory), methodological (Developmental Work Research) and practical elements, using evaluations of FIOH's earlier implementations. The Change Workshop is a participatory developmental method where the participants are guided to investigate the complex and often contradictory elements of their work and its development. The methodological development still continues by creating new applications of the process and new analytical tools to better meet the field-specific needs of different sectors and the local needs of different organizations, and to generate better understanding of changes in work and their relations to the work-related well-being of personnel.

Current work activity is characterized by ongoing changes in technologies, business environments, clients and products. Understanding the developmental logic of work activity is critical as work organizations are challenged to constantly create new, more functional and cost-efficient production and service concepts. FIOH's studies provide evidence that rapid and sometimes quite unpredictable changes in production and service concepts are increasingly the source of well-being problems in organizations and work communities. Re-conceptualizing change is of the utmost importance when developing methodology to promote changes and well-being at work.

The Change Workshop has been developed together with several Finnish work organizations in the midst of their own changes. FIOH's development process of the method is supported by TYKES (Employment and Economic Development Office). The Change Workshop method has been used during 2007-2008 in several client organizations, both in private and public sectors. Processes, results and achievements are reported for the organizations involved (in Finnish), and in scientific conferences (IEA, RWL5, Activity 2008). As part of the methodological development, practitioners in different work organizations have been trained to use and apply the Change Workshop method in developing work and work-related well-being.

Future challenges and plans

The service products of the production line are mostly tailored according to customer needs. The process should be - however - more fluent and effective.

The services are distributed in all parts of Finland. Some services (e.g., ergonomics to product development) could be delivered also in other EU countries. Polarisation of companies, which could use our services, shall be avoided. E.g. some service material is available freely in the internet so that also small and medium sized workplaces can use them. Also distribution channels of services to increase influence are reconsidered.

The financial benefits will be linked more clearly to our OHS service projects. Therefore a high level specialist has been hired to the Centre of Expertise. This is one way to convince managers that practical OHS development projects are profitable when striving to strategic level goals in companies.

In the future, the number of aged or disabled workers is increasing and also workers with health problems or reduced work capacity should be able to remain in the labour market. Private workplaces, public buildings and transportation ought to be accessible for everybody, technical aids made available and work processes modified whenever needed.

Self-evaluation

Current market position within the product line is good (++). Products in the production line are in different positions of the life cycle. Services in cognitive ergonomics have been started, and the channels will be opened. Interest in change workshops in organizations has increased steadily. There is a burning need for methods to model the changes at work, which are increasingly more common. Both ergonomic services and work time services are mature and going very smoothly. Part of the occupational safety services are moving along at an excellent speed (like the Zero Accident Forum), but some safety services need to be redesigned.

The quality is good (++). The products are based on scientific and real-life evidence and good methodological knowledge. The ergonomic services, change workshops, and Zero Accident Forum are superior to the other market supply. According to the client feedback, the services have been successful and helped clients to develop their own understanding and operations. In working time services, the personal resources are limited, and therefore, marketing is limited.

These products are mainly based on the scientific research and development of FIOH. However, some partnerships have been used (e.g., change workshop with the University of Helsinki and Verve Consulting, accessibility evaluation and data bank with disability organizations, Zero Accident Forum is a network itself).

4.3 Work environment development

In this product line, good practices and assessment tools are developed. The aim is well-being at work, work attractiveness and productivity. FIOH offers products for the assessment of risk and overall exposure, risk management as well as risk management systems and target levels of new technologies and materials to assess and plan the work environment. The products include sharing of information and training in occupational hygiene and safety.

FIOH's clients are: occupational health service (OHS) experts and occupational safety and health personnel, management in manufacturing and authorities.

Since 2004, FIOH has worked in a more efficient way in chemical analysis services, increased their productivity and reduced the number of chemical laboratories; and at the same time, it has increased the number of occupational hygienists active in field services. FIOH has put more effort into better cooperation with different professions and worked in a multidisciplinary way.

Effect and impact are the important aims: The number of analysis and reports of occupational hygiene field service are high and increasing. FIOH sends out about 200 reports or results to its clients each week. The quality of these services is based on the quality system under continuous evaluation.

FIOH's services are based on the R&D of its own and international community. New microbiological measurements methods (PCR), new microbe-specific IgM-analysis, new chemical analysis like measurement of fine particles and nanoparticles, methods for new technology wood processing and holistic indoor air quality evaluation are all examples of innovation and new products.

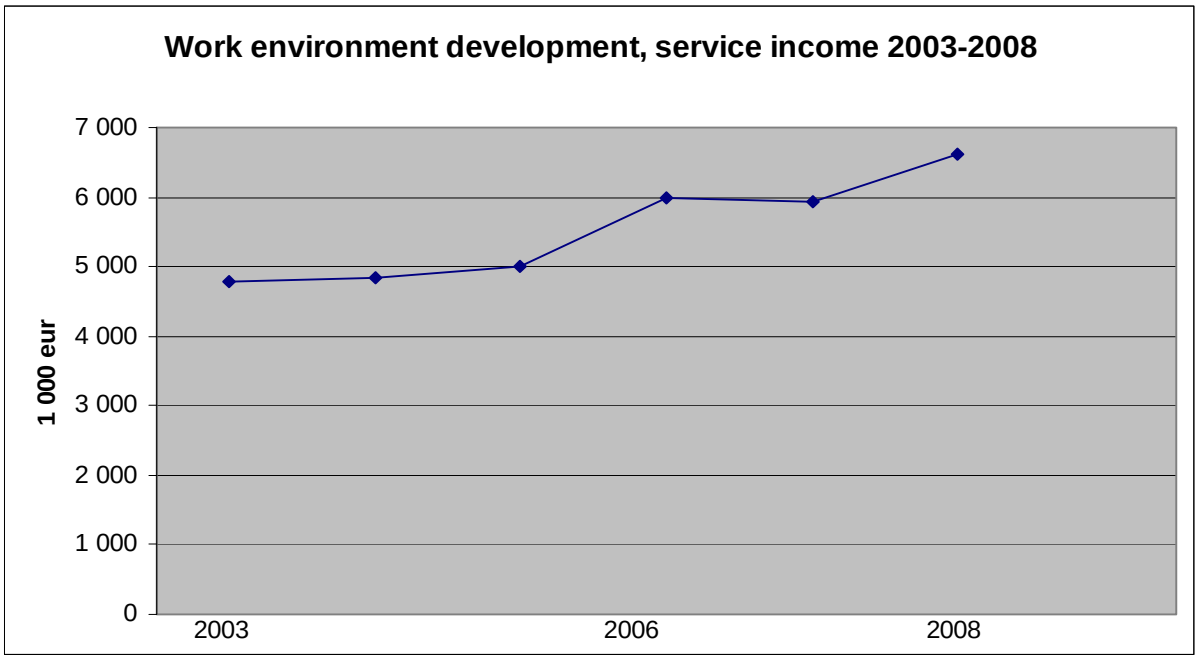
Also, FIOH's well-established services have been improved to comply with modern requirements by developing them to be more comprehensive. This includes e.g. biomonitoring services which have been developed by improving the interpretation of the analysis results and developing new health-based guidance values for biomonitoring analyses. An example of a comprehensive service is also the assignment given by the Construction Material Industry to evaluate the exposure to quartz and possibilities to comply with the new limit values in the concrete manufacturing stations.

FIOH's quality system (FINAS Accreditation), presented earlier, has been essential in developing the expert services also to international clients. FIOH's services to European clients include e.g. REACH services and services related to testing and certification of Personal Protective Equipment (PPE's). FIOH has strived for constant client feedback. About 90 % of FIOH's clients have expressed that the given recommendations for workplaces have been feasible.

Statistics

FIOH's planned resource input in 2009 is about 90 person years and profitability about 6 million Euros. In the next figure, the annual income of client fee-based services in 2003–2008 is presented.

Figure 4.3.1 Service income during years 2003–2008.



During the period 2003–2008, the increase of the income has been monotonically increasing and was about 30 %.

Product Families

FIOH has 10 different product families as follows, and their main products are presented in table 4.1.

- Biomonitoring services
- Emission and thermal degradation control
- Physical hazards prevention
- Chemical analysis services
- Chemicals and dust nuisances Management
- Microbiological and Immunochemical analysis services
- Dust analytical services
- Risk Assessment and Safety Management Services
- Indoor air services and microbiological occupational hygiene
- Testing and certification services of protective equipment

Focal products

Multiprofessional indoor air survey

The multiprofessional indoor air survey is used to diagnose structural moisture damage and determine the qualitative and quantitative exposure to impurities. These studies are used as a part of health risk assessments, as well as in the planning of measures intended to reduce the risk of exposure. The underlying basis for this is the fact that abnormal levels of exposure result in adverse health conditions.

The multiprofessional indoor air survey is a modular product, which can be custom-tailored to each client's specific needs. The survey may comprehend the following components: on-site assessment, symptom survey, technostructural survey, ventilation survey, microbiological measurements and analyses, chemical measurements and analyses, antibody analyses and workgroup consultation. The market position of FIOH is strong, because other providers of indoor air services do not offer similar product ranges.

The indoor air survey provides FIOH's clients with information on impurities present at the workplace, health risks and compromises to comfort levels as well as reducing the impact of impurities. The client can then use this information to improve working conditions and occupational well-being by, for example, planning and executing structural renovations. This also reduces the presence of symptoms and occupational diseases related to impurities and improve productivity.

Multiprofessional indoor air surveys are conducted by eleven persons working in six locations (Helsinki, Turku, Lappeenranta, Tampere, Kuopio and Oulu). Approximately 200 surveys are conducted each year, improving the working conditions of some 15 000 employees.

Focal product

REACH Training and Consultation Services

The REACH regulation, the new chemicals legislation of the EU, concerns all chemical substances which are manufactured or imported, one tonne or more, in the EU area. A chemical safety assessment (CSA) has to be prepared for the substances manufactured or imported, 10 tonnes or more annually.

The REACH consultation services of FIOH offer the preparation of CSA-related health risk assessments covering hazard assessment, exposure assessment and risk characterization to the industry. Since REACH knowledge is also greatly needed in the industry, we offer training on REACH, risk assessment and related subjects - such as classification and labelling - as individual lectures, lecture packages or full courses.

Currently, FIOH has contracts with the industry in order to conduct the risk assessment of metal compounds and alloys. FIOH is involved in the developing of industry guidance for assessing health risks of alloys, and FIOH is giving training on the challenges of the metals and their compounds under REACH.

As offering services from a scientific basis to more practical CSAs, FIOH has only a few competitors in Finland. Most of the consulting firms in Finland offer e.g. law and contract services, economic consultation, information exchange, information technology, and/or technical consulting for preregistration and registration. In the area of toxicology and occupational exposure assessment, FIOH is the only organization able to provide this expertise to industry in Finland. On the other hand, since FIOH's marketing area includes all of Europe, FIOH certainly finds more competition in Europe. However, FIOH is ready to consult also in challenging projects. This is a benefit not all the competitors can offer. FIOH concentrates on the core of REACH - preparing CSA or its parts - and it can offer the independent judgement of scientifically reliable body, which is, in some cases, a big advantage.

Much of FIOH's marketing has occurred through its good reputation which has arisen from its earlier works. One of the key issues is to continuously keep the quality of the services high. FIOH guarantees this by using the network of FIOH experts in toxicology and occupational hygiene and utilizing the deep and long-term understanding of the circumstances at working places. Since FIOH is working with a new product, it also aims to develop the processes of REACH consulting.

Future challenges and plans

Essential development activities on evaluation periods are an improvement in FIOH's efficiency of activity, product selection, clientships and laboratory renewals.

Key client care has begun, e.g. Finnish Railways, and it has been agreed to obtain new key clients (City of Helsinki, Pilkington Oy). FIOH needs these clients in its long-term development process.

Financial efficiency of activities should be described by the product families. The product hierarchy and marketing plans for products should also be specified.

New openings in product selection should be made, e.g. REACH, and follow-up of the personal exposure of stainless steel/welder should be made.

Efficiency of laboratory activities has been developed by decreasing laboratories (4) in regional offices and by concentrating these activities. Also, unprofitable analyses are reduced. Productizing training for experts has started, in the training the meaning of the comprehensive products are emphasized. Also, the development of distribution channels has begun.

Core knowledge has become very clear and influences in near future clarifying to the product structure, reducing the product families, and by linking the products larger entities. There is good demand for products, competition, and the interests are being clarified and the client groups focused. Opportunities are actively identified in productization, distribution channels,

internal and client collaboration, service processes and in standardization of products. Mutual understanding of the wide development of the product line is getting better and creates the will to take advantage of good development prospects. At the same time, there will be more competition in these service areas.

Self-evaluation

Current and aimed marked position: The role of the product line has been traditionally strong, because of FIOH's main research topics and because of a lack of competition. The market position is now excellent (+++).

Quality of products compared to market supply: Because of the high quality of its products and service process, FIOH is satisfied with its own product, but the information and development of the product could be more client-orientated. FIOH should have debug in time of delivery. The grade is good (++). Also, both the clients and FINAS have been satisfied with its quality.

R&D of current products: Ability to renew and innovate new products is now good (++). FIOH's products are based on the demand of its clients. However, FIOH could more effectively control good practices in working life through more effective delivery channels.

4.4 OHS Development and Health and work ability promotion

Overview

The services provided by the team "Research and Development in OHS" aim at supporting OHS service provider's quality enhancement activities. The team provides consultancy services to improve the self-evaluation processes of OHS units. The services include the support to build up processes for evaluation and development of the services ("quality system", consultancy to develop the contents of the services, productization) and to get feedback from clients (employee and employer questionnaires).

In addition, there is an ongoing restructuring of the public provision of OHS services. The government has initiated the re-organization of local public services and merging of municipalities to increase the ability to meet both the quality standards and to decrease the growth rate of costs. OHS units in municipalities need support in administrative issues (variety of organizational model range from budget units to public enterprises, and even further to public companies). The legislation assumes that public providers are self-sufficient, but there is a shortage of knowledge in cost calculation and price setting. The need for these consultancy services will last for 3-4 years.

The questionnaire services are on their development phase. The experiences with clients have been good. The administrative and process consultancies to municipalities will be conducted as a joint service together with the consultancy company.

The products have been created to support the development of OHS. The equipments to support evaluation in OHS will be developed further. Municipal OHS units need support in their reorganization and the consultations have been arranged mostly from that point of view.

The supply of consultations for OHS will be estimated against the development strategy of FIOH. The development of these products supports improvement of the effectiveness in OHS:

Statistics

These products perform but a small part of activities in the development of OHS in FIOH. However, this support implementation is an important part of innovation model. In 2008, FIOH consulted 7 OHS units that covered 53 municipalities and sold 10 client satisfaction questionnaires, and the profit was 50 000 Euros and resources 0.8 person year.

Focal product

The Potential

Product description

The Potential is an instrument for economic analysis when there are different changes in the working conditions. The Potential software model illustrates how changed working conditions reflect to lower employee turnover, reduced absence or increased efficiency influence the production costs and change the productivity.

Scientific basis of product

The Potential model is based on research from FIOH and the Swedish School of Economics & Business Administration.

Product concept

The Potential enables the opportunity of obtaining valid economic analysis with reasonable working efforts. By giving about a dozen variables, the Potential model counts results with more than 300 variables and calculations.

Marketing position

The Potential is a unique product and the only one in the market in forms of software.

Distribution model

Swedish Miljödata AB owns the product, and FIOH is their Finnish and Baltic Distributor. FIOH also has the world-wide selling rights. The support is organized by Miljödata AB and the Finnish Partner in cooperation (WorkWell Oy).

What is the special added-value to the client and the success based on?

A valid economical analysis with reasonable working efforts is extremely difficult to achieve. With Potential, the client can analyse changes and gain more revenue, productivity etc.

Connection to strategy

One of FIOH´s strategic goals is to provide different tools and methods for the needs of working life. The Potential is a product in which the profitability and productivity of the Workplace Health Promotion actions can be demonstrated for the companies and workplaces. The product has originated as a result of research and development. Through product management and service business, it is delivered to working life and places in Finland and abroad.

Future challenges and plans

Core knowledge is divided according to target groups into two product families. Development prospects are strong in both product families. The integrated product palette is under development, and the aim is wide-ranging effectiveness. Awareness of competitive advantages and drive is strong. The marketing has a clear focus, and client collaboration is also being invested into the development. The development work is active and the product line's biggest challenge is responding to demand.

The Act on Occupational Health Services states that OHS units should evaluate the quality and effectiveness of the services provided. Until now the amount of effort that OHS units have invested in self-evaluation to improve the services has been scant (ref. TTHS). FIOH has offered services (tools and consultancy services) to improve OHS unit's skills for self-evaluation and continuous quality improvement. In near future there are plans for introducing an obligatory quality system for OHS providing units in Finland.

Self-evaluation

This production line has been established in 2008. Earlier the development of OHS at FIOH has based on R&D activities, different interventions together with the Ministry of Social Affairs and Health, social partners and field providers of OHS. These studies and interventions have included straightly to the evaluation. After that the implementation of positive results has been done at FIOH through information dissemination, training and education of OHS personnel, social partners, workplaces and, if needed, changes in acts or regulations of OHS have been done in the Ministry. Since 2007 direct consultancy services have been offered for implementing OHS systems' R&D results especially to municipal OHS units. Self-evaluation for this new production line gives a good (++) grade.

4.5 Occupational Medicine Services

Overview

OMS is one of the original FIOH activities, and under which, activity recognition and development of diagnostic methods of occupational diseases have been conducted and preventive initiatives taken. During 2008, this activity has been constructed as a new product

line, Occupational Medicine Services, which offers specialized high-quality clinical services for detecting and diagnosing occupational and work-related diseases, and for evaluation of work capacity and ability. The aim is for advance detection, prevention and treatment at the national level. The specialist training of Occupational Health Services (OHS) physicians is integrated in OMS to support the Finnish network of OHS. Basic elements of OMS (i.e. occupational diseases and training of specialists) are included in FIOH duties, according to Finnish legislation. The product line, provided by existing FIOH clinics and units, is a core part of service activities at the Institute with an estimated 4.5 million euro turnover for 2009.

The clients and interest parties include workers and patients, OHS and workplaces, health care service providers, insurance companies, labour market systems, enterprises, and municipal and governmental bodies. The main fields covered include respiratory, skin and neurological diseases, complete with work capacity and ability evaluations. The services are offered by FIOH in Helsinki and regionally in cooperation with all university hospitals and three other central hospitals in Finland. FIOH OMS experts provide the diagnostic protocols and expertise of occupational medicine for these collaborative clinics. In the chain of care, cases demanding highly specialized OMS methods are evaluated in Helsinki.

Competitors, and partly cooperation partners, include university and central hospitals, primary health care, private health care providers, OHS, and rehabilitation centres.

The product families of OMS providing services for clients include Occupational skin diseases, Pathology of occupational diseases, Specialist training for physicians, Assessment of human functional reserves, Occupational respiratory diseases, Nervous system diseases and cognitive performance, Evaluation of noise-induced hearing loss, Evaluation of other occupational diseases, Work ability and rehabilitation assessments, and Occupational medicine services for workplaces. In addition, Nursing and support services and Medical and expert services in occupational medicine serve the other product families.

OMS investigates 2 500 patients yearly, the majority being suspected cases of occupational disease, insurance compensations covering examinations. In addition, nearly 1 000 employees are evaluated for assessment of human functional reserves. Respiratory diseases encounter 70 % of the referrals for occupational disease. Around 300 patients are investigated for skin disease, 100 for neurological disease, other occupational disease groups being a minor part. Work ability is assessed for 100 cases. OMS also provides service in occupational pathology and houses the national expert panel of pneumonioses.

The diagnosis of occupational disease is made by specialists and expert panels, using international or national diagnostic criteria. The causality between causing agent and e.g. occupational rhinitis or asthma is confirmed by using skin prick tests, measuring specific IgE and performing serial peak-flow-measurements during work and rest days. Often, a specific inhalation challenge or nasal provocation test is included. In Finland, provocation tests for chemicals are concentrated to FIOH. An outpatient clinic for occupational dermatology at FIOH acts as a national reference centre, and has Finland's largest range of test series and substances. Cooperation between clinical experts and FIOH research has introduced several new skin and respiratory allergens. Also, clinical practice to detect toxic encephalopathy is a reference in the field of occupational neurological diseases.

The assessment of human functional reserves consists of the integrated measurements of physical work load at the workplace, recovery after the work and individual performance capacity in the laboratory. The reports are used in the companies to improve the occupational

safety and health care, to prevent decreased work ability, to monitor rehabilitation and in stress management.

OMS arranges a mandatory six-month training period in occupational medicine (from the 6 years' university curriculum) for physicians specializing in OHS - all future OHS specialists are reached. Over 40 physicians complete the intensive FIOH period every year, including supervised clinical work, and lectures and seminars covering the field of occupational medicine.

Statistics

In 2009, about 100 FIOH employees will attend to the OMS product line, totalling in 65 person years (most medical experts work for both OMS services and FIOH research). The budget estimate for 2009 for service income is 3.7 million euro for clinical services and 0.7 million euro for specialist training. An exact estimate of profitability is not possible, as OMS is a new product line, differing from the previous functional and budget structure. According to a preliminary estimate, the service income does not completely cover all expenses. The whole service process from referrals to statements is currently under actions of improvement. Improved process advances profitability, although the core elements of OMS (occupational diseases and training of specialists) belong to FIOH functions defined in Finnish legislation. Therefore, the main aims are high-quality service and a broad effect on the well-being of the working population.

Focal product

FIOH Occupational Medicine Services

The complete FIOH Occupational Medicine Services (OMS) product line is presented as a focal product, as OMS with cooperation and network arrangements contributes to several strategic goals of FIOH.

Scientific basic of product:

FIOH Occupational Medicine Services (OMS) benefits from basic and applied FIOH research on work-life exposures and work-related diseases, and from innovations in detecting and investigating methodology. OMS, in turn, generates research materials and personal expertise essential for FIOH’s research activities.

Product concept

Please see 4.5. Overview for a more detailed description. OMS is a new product line offering specialized high-quality clinical services for detecting and diagnosing occupational and work-related diseases, and for evaluation of work capacity and ability. The aim is for advance detection, prevention and treatment at the national level. The product line, provided by existing FIOH clinics and units, is a core part of service activities at the Institute with an estimated 4.5 million euros in turnover for 2009.

Focal product

Specialist training in occupational health services (OHS) and occupational medicine (OM)

The training of OHS specialists in Finland was too small compared with the national need, about 20 in a year n the 1990s'. The need of new specialists in OHS was calculated to be about 50 per year. A bottleneck was in the number of posts for specializing physicians at FIOH (training of occupational medicine of the university curriculum, 6 months); that was an obstacle in trying to increase the number of graduations to the goal, 50 a year. In 2002, a proposal from FIOH to the Ministry of Social Affairs and Health and the Ministry of Education lead to a new act on financing the enlargement of specialist training at FIOH, at the medical schools in five universities and in OHS units. The act came into force in January 2005. That made it possible to increase the training of OHS specialists; so the annual number of graduations came to 51 as the four-year mean (Table 4.5.1).

Table 4.5.1 Physicians specialized in OHS in 2002-2008, and the number of trainees in 2009.

University Medical School	Current number of Trainees	2002	2003	2004	2005	2006	2007	2008
Helsinki	228	2	4	4	14	16	19	14
Kuopio	91	15	13	13	10	3	7	10
Oulu	106	2	6	7	9	6	6	6
Tampere	157	9	8	11	14	18	14	13
Turku	90	3	2	4	7	3	9	6
Total	**647**	**31**	**33**	**39**	**54**	**46**	**55**	**49**

The financing increased the input in developing the quality and content of the training curriculum and made it possible to also start training the tutors.

FIOH gives training also to occupational medicine specialists (a two-year additional training on top of OHS training). In the years 2007 and 2008, two specialists have conducted the training.

FIOH devotes an essential amount of input into the training of OHS and OM specialists.

Marketing position and distribution model

FIOH is nationally the most advanced centre for the study of occupational respiratory, skin and neurological diseases. Its expertise is based on patient work, training of specialists and internationally recognized top-level scientific research. The OMS product line is a part of chain of care in Finnish health services; cooperation with OHS is emphasized. Clinical work and specialist training are nationally appreciated by clients and interest groups. The highly focused clinical evaluations offer a basis for decisions made by insurance companies.

Connection to strategy

OMS contributes to several strategic goals of FIOH, and the benefits are not only due to individual-level clinical investigations or workplace feedback. Cooperation with FIOH research generates knowledge to promote safer workplaces and workers health. Because of the high coverage of OHS in Finland, the mandatory training of OHS specialists by OMS has a considerable effect on the well-being of the working population.

Future challenges and plans

Currently, FIOH is nationally the most advanced centre for the study of occupational respiratory, skin and neurological diseases. Its expertise is based on patient work, training of specialists and internationally recognized top-level scientific research. The OMS product line is a part of chain of care in Finnish health services; cooperation with OHS is emphasized. Clinical work and specialist training are nationally appreciated by clients and interest groups. The highly focused clinical evaluations offer a basis for decisions made by insurance companies.

OMS contributes to several strategic goals of FIOH, and the benefits are not only due to individual-level clinical investigations or feedback to the workplace. Co-operation with FIOH research generates knowledge to promote safer workplaces and workers' health. Because of the high coverage of OHS in Finland, the mandatory training of OHS specialists by OMS has a considerable effect on the well-being of the working population.

In 2009, the challenges for the new product line include process and quality development. The already ongoing development projects of existing FIOH units and clinics will contribute. New FIOH-level computer program systems allow a detailed follow-up of income and expense trends. Possibilities for new service products are evaluated. Client-oriented information and marketing measures are planned. Future plans include a more extensive inclusion of work-related diseases in addition to occupational diseases. Musculoskeletal diseases and mental health problems (especially depression) are prominent causes of sick-leaves and sickness pensions, and should, in future, be addressed more from the clinical service point of view. FIOH produces a high quality of research on the work-relatedness and prevention possible of those diseases. The clinical services are mainly at the occupational health centres, in which professionals should be supported with the knowledge on the prevention and cure. Another aim is to seek more advanced cooperation with OHS system and specialized hospital clinics in selected matters. A broader feedback for workplaces is also being focused on. Co-operation with FIOH research will result in new methods for early detection of work-related hazards.

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Current and aimed marked position: ++

The OMS product line is a part of the chain of care in Finnish health services, co-operation with OHS is emphasized. FIOH functions as a national diagnostic centre for occupational diseases. Examination of problematic occupational disease cases is centralized in FIOH. Thus, the current market position is excellent in occupational diseases, also in specialist training. However, the position can be improved rather in other work-related diseases than occupational diseases and also in work capacity and ability evaluations.

Quality of products compared to market supply: +++

FIOH is nationally the most advanced centre for the study of occupational respiratory, skin and neurological diseases. Its expertise is based on patient work, training of specialists and internationally recognized top-level scientific research. The scrutiny of diagnostic procedures is in general, more thorough than in general health care, because a.o. of the juridical aspects of the activity in the society. The numbers of trained physicians (the 6-month period on occupational medicine in the curriculum of occupational health service specialist physicians) have increased from about 20 in the 2004 to over 40 in 2008. The increase was made possible by governmental financing for the years 2005-2008. Clinical work and specialist training are highly appreciated by clients and interest groups on the national level.

R&D of current products: ++

(See also previous item.) Quality of products compared to market supply. OMS benefits from basic and applied FIOH research on work-life exposures and work-related diseases, and from innovations in detecting and investigating methodology. Cooperation and partnerships with outside service providers could be increased.

New products are developed, based on the recognized needs in the field. The product "second opinion in occupational medicine" -service (work name) aims to give an expert assessment to OHS of e.g. health examination findings or early suspicions of work-related symptoms. The contents are presented to OHS units in South-Eastern Finland in 2009. Another product aims to offer (group?) rehabilitation and develop new rehabilitation programs for people who are not recovering as expected from diseases or symptoms related to sick-building syndrome. Systematic feedback to workplaces through OHS, in connection with the diagnostics of occupational and work-related diseases, has been developed and piloted in 2007-08. The program continues in a development project financed by the Ministry of Social Affairs and Health, where new methods to implement the feedback effectively to the OHS are tested.

Ability to renew products: ++

FIOH is in the front line of development in services related to the field of occupational medicine and the market leader in product quality.

The core knowledge is clear. The product structure for better client-orientation is in progress. Effectiveness of products and the role of governing the market, aims to contribute to the development. The products are being developed traditionally, but also the internal cooperation and distribution opportunities are observed, e.g. the possibilities to collaborate more with the experts on musculoskeletal diseases and is mapped. The collaboration with the experts in musculoskeletal and mental disorders (mainly depression, burn out etc.) takes place in connection of the work ability assessments. As a new product line the development is in the beginning stages.

4.6 Training

Overview

Basic training tasks in the Finnish Institute of Occupational Health

Special emphasis in FIOH training is focused on the skills and competence in the good practices regarding occupational health service (OHS), occupational safety and health (OSH) and well - being at work. The goal is to strengthen comprehensiveness of the respective interdisciplinary activities and their linkage with the strategies in the organizations concerned.

Training is especially targeted for:

- occupational health service (OHS) professionals, experts and trainers,
- occupational safety and health (OSH) experts and personnel (managers and delegates),
- experts and staff in personnel administration and human resources development,
- management and foremen in manufacturing and experts in production planning,
- general public and NGOs,
- social partners and professional associations, and
- authorities in national and regional levels.

FIOH has also opened international training, e.g. in Age Management and in REACH for chemical safety. FIOH is also a key collaborator in the training activities of NIVA (Nordic Institute for Advanced Training in Occupational Health).

The impact is a key element in training activities of FIOH in all strategy areas. Training aims to improve clients' problem-solving and development processes, and utilization of the latest knowledge regarding adult education and learning organizations. The training is based on the R&D activities of FIOH and the whole scientific society concerned. Training is offered mainly by FIOH’s own researchers and experts. Still, practically no full-time trainers exist in the Institute.

FIOH training meets the qualifications set for OHS professionals and specialists in OHS legislation. Qualification training aiming at development in the area of work environment and work communities is additionally being introduced.

FIOH provides:

- training for qualification of OHS nurses and physicians and (in collaboration with universities) for physicians specializing in occupational health as well as qualification

training for others in the legislation-mentioned OHS specialists. (Approximately 23 % of close to 20 000 trainee days concern this stipulated qualification training annually),
- advanced and further training for various actors in the world of work (65 % of annual trainee days), and
- tailored courses for companies and organizations (12 % of trainee days).

More than 2 500 hours of lectures are given additionally by experts at various seminars and meetings annually in enterprises, universities in applied sciences, NGOs and, in general, open seminars. Close to half of the training activities are organized regionally. All together, close to 300 courses are arranged by FIOH per year (Table 4.6.1.).

Table 4.6.1 Course activities in 2004–2008.

	2004	**2005**	**2006**	**2007**	**2008**
Participants	7 198	7 013	6 965	9 355	8 458
Trainee days	19 972	18 819	17 252	19 557	19 224
Courses	239	236	248	286	279

In addition to the course activities shown in table 4.6.1, FIOH offers training modules for various national and international training, research and development programmes, especially in the projects funded by the European Social Fund, Public Health programme, Phare and Leonardo da Vinci programmes. Furthermore, FIOH has offered training in connection with the Zero Accident Forum events for the members of the forum.

Client segments and partnerships in training and impacts aimed among different client groups

OHS experts (physicians and nurses), as well as other specialists required for the production of OHS (e.g., physiotherapists, psychologists, occupational hygienists, technical and agricultural advisers, nutritional therapists, optometrists, ergonomics, physical exercise specialists etc.) hold the highest number among participants in FIOH training.

Safety managers and employees' safety representatives (delegates) are another significant group. Since health and safety requires multiprofessional collaboration in enterprises and organizations, FIOH has endeavoured to reach wide-ranging target groups for training, especially managers and specialists in key positions, such as HR managers and developers (HRD), industrial and production managers, and planners. Increasingly, participants represent multiprofessional teams from companies (e.g. occupational health, HR experts, safety representatives and managers jointly) (table 4.6.2.).

FIOH also considers trainers and coaches in leadership academies, in the training institutions of social partners and in other respective training institutes as playing an important role in the future development of OSH in Finland. Special partnership agreements or more informal collaboration have been established with some universities and other training institutions, such as medical faculties, management schools and training institutions of social partners.

For example, a special training development consortium has been established between FIOH and the most important management schools in Finland (Management School for Civil Servants (HAUS), Industrial Management School (POHTO), Employers School of

Management Skills (JTO), Management School of Municipalities (Efeko), Association of Adult Education Institutes (AIKE)).

Table 4.6.2 Distribution of participants in training 2004–2008 (%).

Participants	2004 n=7198	2005 n=7013	2006 n=6965	2007 n=9355	2008 n=8458
OHS experts and specialists	40	41	37	42	36
Safety managers and delegates	21	19	20	17	22
Personnel administration & HRD	5	4	7	6	6
Production sales, and technical staff	8	9	8	9	10
Others and FIOH staff	26	27	28	26	26
Total	100	100	100	100	100

Training process and partnerships

Training is mainly arranged at FIOH's own premises, but also in the enterprises in the case of companies which order tailored courses. Training managers, training planners and training assistants support the training process through annual planning process, training of trainers pedagogically, development of training products and by maintenance of the training infrastructure and administration.

Planned resource input & profitability 2009

For the year 2009, 219 courses are planned by the teams and units of FIOH. This is the highest number ever. Close to 100 person years will be allocated to the training activities. The income is estimated to cover most of the input offered by the Institute. Some legislation-based competence training in OHS is not even aimed to be totally covered by the fees, but is included in the state subsidy.

Main development activities in the training 2006–2008

The main emphasis has been in the high-quality, smooth and cost - effective training process. Thus, the "Good Training Practice Guide" has been prepared for the quality manual guide for the staff participating or steering the training process in FIOH.

Additionally, a questionnaire - and interview-based evaluation model - is established and data are collected regarding the quality, effectiveness and even the impact of FIOH's competence courses, not only promptly after the course via the internet - based questionnaire, but additionally as a delayed evaluation of the results in the work places of the participants. This was also recommended in the previous international evaluation. According to these results, the training events and courses have been developed - not only from the pedagogic point of view - but also regarding the contents and knowledge base.

Furthermore, the ICT system of the training process has been renewed, with the aim of a more effective marketing, smooth client management and modern administration system.

The E-learning system has been established and used in most long-term OHS competence courses. In the training of FIOH's own trainers, action learning and other recent pedagogic methods have applied. Training has been increasingly combined with the development services for and with the clients.

Statistics

In the figure 4.6.3, the income (in million Euros per year) of client fee-based training activities annually in 2003–2008 is shown.

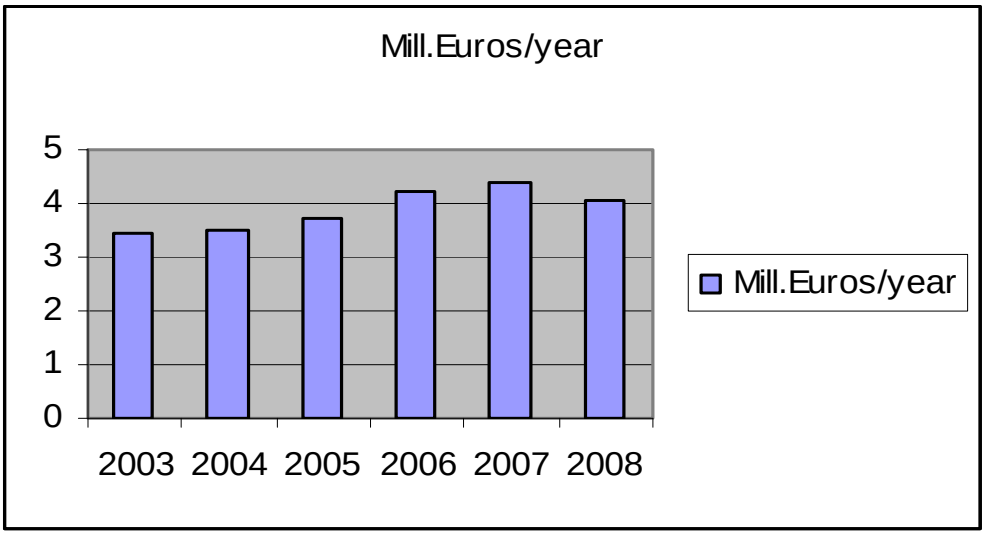


Figure 4.6.3 Income of client fee-based training activities.

The total income (includes in addition to the fee-based training, also the training of specialist physicians in occupational health; funded by the legislation and thus the Ministry of Social Affairs and Health) some 0.87 million Euros higher than the incomes in 2007 and 2008 presented in the figure above.

During the period 2003–2008, the increase of the "sold" training courses has increased by 19 %. On the other hand, the approximated person years used for these training efforts have decreased by close to 10 percent during the evaluation period 2006–2008.

In Table 4.6.4., the number of occupational health specialists trained in FIOH is shown.

Table 4.6.4 Occupational Health Service experts and specialists trained by FIOH 2002–2008.

	2002	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*Together*
OH Physicians	72	126	114	104	62	76	72	626
OH Nurses	64	97	88	85	79	58	74	545
Physiotherapists	49	48	34	34	32	40	26	263
Psychologists	20	34	21	30	26	25	26	182
Opticians	131	57	34	22	48	63	85	440
Nutritionists			17	13	11	17	14	72
Speech Therapists			32		4	1	5	42
Physical trainers			20	5	4	1	8	38
Occ. hygienists, technical				46	4	7	7	64
Agricultural advisers		23	8	11	8	17	9	76
Total	336	385	368	350	278	305	326	2 348

Product Families

- Development of work environment (Risk assessment, Development of occupational safety)
- Development of work processes and methods (Ergonomics and usability, Job hours and cognitive ergonomics)
- Development of work communities and organizations (Developing work and well - being of the work community, Life course and work - coaching)
- Development of occupational health and work ability (Competence training for OHS professionals, occupational and work - related diseases)
- Seminars and conferences (Occupational Health Days, Studia Generalia)
- Internal training support services (Training of FIOH trainers, training assistant services)

Focal product

The training has been developed in accordance with the recent strategy. In addition to OSH experts, more and more training has been directed for social partners, production designers, line organization and CEOs and HR actors. Themes of the change management and support for vulnerable groups in changes of the working life and career are examples of new openings.

Special nation-wide training "road shows" ordered by the Ministry of Social Affairs and Health have been carried out. During the evaluation period, they have concerned the good occupational health practice, healthy indoor environment and prevention of depression in working life.

New training products are developed regarding age management and ageing and work, management of critical transitions during life course and well-being at work. These activities have been developed in keen collaboration with the consortium of management schools and adult education institutions.

Training "paths" are established and offered for those clients who need an individual learning process from basic courses towards advanced learning. The "path" offers a plan and training curricula with reasonable courses and e-learning modules when the trainee is interested in deepening or widening his or her knowledge, skills and competences through an advanced and flexible two-year training programme. "Studia Generalia" - type open lectures are organized and opened for citizens and the general public.

In addition, the use of new methods, such as virtual university and e - learning, has increased. A new internet-based service, free-of-charge, was established (Duunitalkoot) and training regarding its´ use is offered. "Duuniltalkoot" is a new structure of FIOH web pages based on the client group "menu" besides the traditional structure of scientific categories in its www site. "Duunitalkoot" also offer tools for the self development of organization, work environment and occupational safety and health. Separate channels are also offered for individual workers, work groups or teams, managers and leaders, HR developers and entrepreneurs.

The highest number of participants, in addition to the stipulated competence training programs, has been in the courses in further education, dealing with health examinations in the case of very hazardous exposures, the use and interpretation of drug tests in work life, hazardous chemicals, safe use of cytostatic medicines, welding and work environment and eyeglasses and VDU work. Also, themes of the ventilation and personal protection equipments have been very popular. Still, highly popular courses have been the mental health at work and coping with the high sickness absenteeism and alcohol abuse and healthy behaviour in companies. Workers health in structural changes, coping with the change and the maintenance of work ability are popular themes as well.

Annually, more than 800 hundred people participate in the "Occupational Health Days" organized during the European Week for Safety and Health at Work. The annual "Work Ability Day", organized in May, usually gathers approximately 100 participants.

New training for the certification of personnel management experts and consultants in aptitude testing in the recruitment situation is established in collaboration with the Finnish Association of Psychologists which chose FIOH solely for this certification training. FIOH also plays a central role in the certified training of Safety Card trainers in Finland. Other certified trainings cover manual lifting in health care and personal protection equipment (PPE) sales personnel for correct selection of different types of PPE. Additionally, training for certification of inspectors of protective devices against high-elevation falls is arranged. Other trainings are also under preparation. Certified training in collaboration with intermediary organizations is a very effective way of transmitting information to working places, even small ones.

Future challenges and plans

1. Further development of congruence between the training offered and needs of the clients, especially in regard to the rapidly changing working life and new health hazards.
2. Preparing to cope and manage with the consequences of the global and national economic depression in regard with the possible decrease of the training markets and the increased need of training concerning:
    - the management and coping with the stress and
    - crisis in the connection of consequences of economic depression.
3. More emphasis has to be offered for effective marketing of courses and training programmes. The best results in marketing are achieved if the training product and training event is planned jointly with the representatives of potential clients or companies.
4. Making analysis of trainings which could be certified and coordinating the training curricula for occupational hygiene competencies.
5. Participating in the development of joint products with other services of FIOH.
6. Making an analysis of and participating in the international training in FIOH.
7. Increase of cost - effectiveness of the training process and pedagogic methods used, especially through the new good training practice manual and by analysis of the success factors as well as of the reasons for cancelled courses.
8. Launching of the evaluation model for the assessment of training results and impacts.
9. Establishment of the new ICT system for training process, especially in the marketing, administration of the training as well as in the learning material production.
10. Establishment of a new e-learning platform and training of trainer in action learning

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Current and aimed marked position: ++

The role of FIOH in the training of occupational health and safety has been traditionally strong, not only due to the legislation concerned, but also because of the main research topics of FIOH: Market position is currently good: excellent in OHS and occupational medicine, good in work environment, occupational safety and ergonomics, moderate in psychosocial

and HR issues, corresponding mainly to the intended goals. The role of FIOH in the training of managers and HRD experts has been increased recently, but the market position is still weak.

Quality of products compared to market supply: ++

Currently, (when ordered and offered) it is good. There is still lot to do in the formulation of the training products, for example, more client-oriented and user friendly.

R&D of current products (own, partnerships etc.): ++

Ability to renew products is currently good in the main FIOH strategy issues. More emphasis is needed in the product development process in a creative way. In the product development more emphasis should be put on the goals of effectiveness and impact. Training should be planned with the aim of systemic effect. It requires the recognition of networks and mediating actors needed for the systemic effect. It also requires the collaboration and the integration of the training with the R&D, other service production and information services regarding the theme concerned.

4.7 Information and communication

Overview

FIOH has an established position as a trustworthy information provider in issues related to working life, occupational health and safety. The main goal is to ensure that information produced by FIOH reaches citizens, workplaces, occupational health and safety professionals, and the relevant decision-makers in an accessible form. FIOH's information strategy was renewed in 2006: more emphasis has been placed on the development of research communications and on the increasing role of electronic communications.

The former international evaluation report of FIOH (1997-2003) stated that the information dissemination model at FIOH is a useful way to conceptualize the relationships between FIOH’s core processes, and FIOH has advanced practices that enforce the functioning of these relationships. The report emphasized further development of web services and electronic publishing as well as of periodical TTT. Besides scientific publications, the report recommended to focus on production of publications to occupational health and safety personnel, the government, employees and employers. Furthermore, information service should continuously monitor the use and non-use of their products and evaluate the effectiveness of these products through market studies.

Statistics

KEY FIGURES IN INFORMATION AND COMMUNICATIONS	2006	2007	2008
Popularized articles authored by FIOH staff	485	430	357
Publications by FIOH			
- New titles	43	46	33
- Sold copies: publications - Sold copies: forms	37 936 140 000	42 716 145 900	37 852 146 560
- Työ Terveys Turvallisuus magazine, number of circulation	64 454	61 903	64 678
Library and information services			
Loans and article copies	15 998	11 075	11 699
Library visits	3 531	2 367	2 198
Search requests	21 014	19 656	23 900
Media communications			
Number of Press releases	43	52	62
Number of Press conferences	13	8	11
Attained total Circulation (millions readers)*	31	41	38
Web services: www.ttl.fi			
Total number of visitors / visits (2008)	754 000	842 400**	1 017 294
Total number of visits on thematic sub-sites	301 000	337 240**	388 046
Total number of subscribers of FIOH Electronic Newsletter (decision makers, media, occupational health personnel, clients)		2 000	2 900

* 2008 the follow-up criteria was changed. Only newspapers were followed; magazines or professional magazines were not.

** the program used in statistics of visits was changed.

Product Families

- Books and periodicals (text books, handbooks, "Towards a human work life" guidebooks)
- Web and library services
- Public relations and communications (annual report, fact sheets, press releases, exhibitions)
- Internal Communications (intranet, email, personnel magazine and training on communications)

FIOH's publications are primarily targeted at working life needs and aim

- to increase awareness and knowledge of occupational health and safety issues,
- to help workplaces create good working conditions and a safe and healthy environment,
- to analyse and propose solutions to problems arising in working life, and
- to promote the work ability and well-being of workers.

The publications are an important part of the innovation chain, as they are widely used as training material, and they contribute to the service actions of FIOH. Due to FIOH's main client segments, the publications are mainly written in Finnish and several also in Swedish.

"Books and periodicals" consists of 13 product groups and about 280 products. All books FIOH publishes are distributed through the FIOH bookshop. In addition, all the major bookshops and book dealers in Finland sell FIOH's publications. The circulation of the "Työ Terveys Turvallisuus" (TTT, Work Health Safety) periodical is 62 000 and each issue has about 179 000 readers.

FIOH's library and information services are important, especially to FIOH's researchers. The visits to the library have decreased in recent years, but the usage of the electronic material and the information Help Desk has increased. An important task is to train FIOH's researchers in using electronic material and to keep adequate material available.

In 2008, the total number of visits per year on FIOH's website (www.ttl.fi) exceeded one million for the first time. According to an online user survey conducted in spring 2007, FIOH's web service received an overall grade of 8.5. The number of www pages has increased from 5 121 in 2005 to 9 153 at the end of 2008. There are some 20 publications, several research reports and four magazines (three in English and one in Finnish) on FIOH's web site. The web site also contains the full texts of the periodical People and Work published in 2001–2007. The periodical People and Work is no longer issued, but the People and Work Research Reports will be published on the web site. Electronic books are also distributed through Ellibs, a company that sells electronic publications and has made a special effort to reach libraries.

The website was last revised in 2003, and both the structure and the content were created before FIOH's new strategy and organization were established. Therefore an extensive project for renewing the website (www.ttl.fi) began in early 2008, and the new site will be launched in spring 2010. FIOH's information on the web should better respond to the strategic focal points and consumer needs. The new technical structure enables the use of interactive services and better usability. The content is aimed to serve researchers, professionals and decision makers, as well as ordinary citizens. A new more client-oriented e-book stor*e* was opened in February 2009. The web journal Työpiste (Work Place) will be launched in March 2009. The web journal will include news and interactive items, and the main target group is young workers.

FIOH continues the collaboration with Duodecim Medical Publications Ltd. Today about 30 electronic publications are distributed through the Duodecim Occupational Health Library, and the number of electronic publications (especially large handbooks) will increase during the coming years. In addition, evidence-based clinical guidelines are published on Duodecim's internet service for occupational health professionals.

The amount of research news increased when a scientific editor was employed to produce executive summaries of current research topics on FIOH's website. The electronic newsletter was established in 2007. The 3 500 subscribers of the newsletter include policy makers, OHS personnel, media and individual citizens. The newsletter focuses on the Finnish and international research on occupational safety and health as well as products, services, courses and events offered by FIOH. The electronic newsletter will support the marketing of the web journal. (See Focal achievement 3.4.)

FIOH produces about 50 press releases per year and organizes about 10 press conferences per year. The achieved circulation has ranged from 30 to 40 million per year.

Exhibitions are a channel for presenting the products and expertise of FIOH as well as gathering feedback and ideas from clients. FIOH uses both its own stands in exhibitions as well as working in close collaboration with the other Institutes and Authorities under the Ministry of Social Affairs and Health.

According to legislation, one of the tasks in FIOH is to carry on publishing and information activities in the field of occupational health and safety. Therefore, the government supports for the web and library services as well as public communications of FIOH.

Focal products

The "Työ Terveys Turvallisuus" (Work Health Safety) periodical

The "Työ Terveys Turvallisuus" periodical plays a key role in reporting FIOH's research activities and the dissemination of topical information of occupational health and safety at workplaces. Practical ideas on how to improve the work environment have been found to be one of the most efficient ways to achieve changes, and such cases are often published in the periodical. According to a readership survey made in autumn 2008 the readers find this kind of information highly useful. According to the National Readership Survey, the "Työ Terveys Turvallisuus" periodical is the most widely read magazine in Finnish workplaces. Eight issues are published per year. In addition to the regular circulation, two issues per year have been mailed to enterprises with more than five employees with the aim of reaching the management of the enterprises.

"Towards a human work life" guidebooks

In this series of books, we publish popular texts on issues that are of interest for persons who want to take care of their health and well-being. In addition, the books are suitable for actors in work places, in order to improve the well-being of the employees and also to give important information for decision makers. FIOH aims to reach a large audience with these popular guidebooks. The competition is quite stiff. All FIOH's guidebooks are written by experts. This fact is a benefit compared with competing publishers. The media has been very interested in these books. The issues have been dealt with, and the authors have been interviewed in the press, radio and television.

Books on legislation of occupational safety and supervision of labour protection

The books dealing with legislation of Occupational Safety and supervision of labour protection are in great demand. These books have a good position on the market, as FIOH is known as a trustworthy publisher in this field. FIOH is also well-known in its main target group, the health and safety professionals.

Future challenges and plans

The Information and Communication activities should be even better integrated into the innovation chain. The production process of publications should be developed. More effort should be put on marketing and collaboration with e.g. different associations and regional actors. When planning products and developing marketing we must pay more attention to the fact that employees of different ages and from different cultures have their own needs and capability to utilize information. There is also a need to increase dissemination of research results in English, e.g. on FIOH's web site and through an international distribution network, as well as to improve the follow up of the international media coverage in the future. However, these actions demand more resources and are dependent on FIOH's strategic decisions.

Self-evaluation

(Moderate +, Good ++, Excellent +++)

Työ Terveys Turvallisuus periodical: ++

The periodical has 179 000 readers; the circulation is 65 000. The main target groups are occupational health and safety personnel, authorities and politicians. The periodical has no relevant competitors. The concept and design of the periodical has been renewed, which further strengthens the position. However, FIOH should increase the collaboration with other magazines in the field of working life.

Text books and hand books: +

The market position of some books is excellent, and the overall market position of this group is good. The authors are the best experts in their own fields. However, FIOH's ability to respond rapidly to changes could be better. The time-demanding production process of the publications is challenging and should be further developed.

"Towards a human work life" guidebooks: +

The market position is encouraging. Overall, the sale is good, and the media has discussed issues the books deal with and interviewed authors. FIOH's strength compared to competitors is the competence of its authors, FIOH's good reputation and established position. FIOH's challenges are the time-demanding production process and a lack of professional marketing.

Media contact: ++

A media survey among the institutes and authorities working under the Ministry, made by the Ministry of Social Affairs and Health in 2007, showed that FIOH's communications are very professional and up to date. The journalists are mostly interested on research and would like to receive their information through electronic newsletters, web and press releases. The journalists would also like FIOH to be more active and interactive in its communications. However, according to the survey, FIOH is not very well-known among the regional media. The number of press releases has increased from 40 to 60, mostly due to the growth on research communications. Seminars for media with short presentations on current topics have

been arranged in Helsinki and in the regional offices on a yearly basis. The international media has also recognized the studies of FIOH.

Exhibitions: ++

The exhibition stand was remodelled in 2006 and has received positive feedback. Also, the internal exhibition process, reporting system and instructions were evaluated and updated. FIOH participates every year in about 20 exhibitions. In 2008, the exhibitions gathered altogether almost 500 000 visitors. On many occasions, the experts also gave short presentations.

4.8 Special tasks

The Finnish Institute of Occupational Health has separately designated tasks to perform under crisis-related and emergency conditions. In addition, the Institute is establishing the preparedness for other actors to function under such circumstances.

FIOH is developing and maintaining specialist expertise in specifying chemical exposures appearing at work as well as assessing exposure in general and the risks to health caused by chemicals. For this reason, the Institute has been given the task, in co-operation with the authorities, to look after the planning, direction and specialist tasks within the country connected with the Strategy for Protecting Vital Community Functions (SPVCO, 2006). These duties include the upkeep of C-laboratory preparedness, preparedness-based measurement operations, awareness of chemical-related health risks and the generation of information on chemical risks and their prevention, as well as the coordination of a network of experts in C-threats. Similarly, under emergency conditions (such as a state of war, threat of military conflict, etc.: see Emergency Powers Act 1080/1991), the Finnish Institute of Occupational Health participates in the protection of the population against chemical risk. Related to these activities, a FIOH expert has participated as a nominated representative for Finland in the EU Health Security Committee Working Group on Chemical Threats (EU HSC WGCT) during the years 2004-2007.

FIOH's areas of emphasis are the safety occupations and the security of safety personnel. The personnel working in the rescue services, police and defence forces as well as other safety fields should be able to preserve their functional ability in the widest possible situations of crisis/risk and emergency conditions, in which intense strain on physiological and mental resources appear. Under crisis conditions, those outside the safety occupations are also obliged to work under circumstances comparable to the daily operations of the safety fields. FIOH is developing risk assessment and management methods in addition to operational procedures for exceptional situations and is evaluating protective measures and tools. In crisis and emergency situations, the ability to cope on both the part of the personnel in charge and others involved is put to the test; FIOH is developing and distributing procedures to function in a controlled manner and communicate effectively under such conditions. FIOH is also developing staff selection criteria for critical safety fields and aiding in the choice of personnel.

The Finnish Institute of Occupational Health tests and assesses the operability of personal protective equipment, performing R&D work for the purpose. This activity supports those working in the safety occupations and, for example, the work of personnel in the welfare and

public health services in the sort of disruption to normal conditions and emergencies in which there is a risk of employees becoming exposed to dangerous elements. For example, FIOH has compiled protection-based instructions against the risk of avian influenza (bird flu) for employees who must deal with dead birds.

The Institute is also furthering know-how in employees' health care under crisis and emergency conditions. Duties respective to supporting workplaces in terms of occupational health care include first aid at the workplace, which also contains the first aid related to crisis communications and mental health in various crisis situations. FIOH lends support to employees' health services in this task through training, as well as guidelines in accordance with good occupational health care practice. In epidemic and pandemic situations, the Finnish Institute of Occupational Health transmits bulletins from the National Public Health Institute to the occupational health services.

4.9 Client services – Self-Evaluation

The strategic goals and FIOH's resources have been in accordance with its legislative mandate and the relevant strategic objectives set by MSAH. FIOH has concentrated especially on health promotion and making work more attractive, improving efficiency in OCP, taking care of people in different age groups and various themes in environmental health. Well-being at work, gender equality, unemployment, multiculturism, substance abuse and new technology are examples of the subjects showing FIOH's policy-related orientation. The evaluation grade is excellent (+++), because FIOH has reacted as agreed.

The policy relevance and client results of FIOH have been adequate and applicable in respect to the needs of FIOH's clients. With authorities, FIOH has the annual result agreement and relating to that evaluation by MSAH, FIOH's grade is excellent. In the same way, FIOH can conclude by noticing its activities and other client segments like workplaces, citizens, mediating bodies, development of occupational health and working life, collaboration between occupational safety and health that FIOH has succeeded well enough (good, ++).

Because about 90 % of FIOH's clients have been satisfied with its services, FIOH believes its products integrate with client processes well. Last year, FIOH has improved its ability to react more effectively to client needs. Its productization process also aims at improving the product supply against future needs of working life. FIOH is also just now developing its use of partnerships, mediating bodies and other distributions channels in disseminating outputs to clients. As an example, it can be mentioned FIOH's themes which had increased the added value of the innovation model of FIOH (good ++).

Operational efficiency in innovations and quality relating to FIOH's services could be evaluated on the basis of its quality system. According to FIOH's visiting evaluators, it has managed well, and there have been only a few comments of improvements, and response has been very positive. FIOH has also clearly improved its profitability and productivity, which can be seen as the increase in production figures (good ++).

One part of the quality system is the knowledge and competence of FIOH's personnel, which it has started to improve. It has been made the knowledge maps of FIOH's experts and also map of the possible development of their carrier to guarantee sufficient competence for the

forthcoming needs at FIOH (good ++). The amount of the future resources will be the problem, because FIOH has been informed that it should decrease the number of its staff.

Summary of FIOH's product line audits

In the autumn of 2008, FIOH audited all of its product lines. The product line audits considered product development, development potential, the competitive situation, and key client groups. On the basis of the audit results, it was observed that FIOH as a whole understands the essence of its service and service products, but progress, eagerness and attitudes clearly differ among the different product lines. In terms of management, the audit found that there are currently too many product families and recommends reducing the number in half.

The development requirements of the audits include clearer criteria for successful products, instigation of a development forum for product family leaders, improved product marketing, productization support, product maintenance and development of the productization process. Development of service management was also discussed, and the general conclusion was a need for focus. FIOH will proceed with development in all of these areas.

The good practices of FIOH's products and activities should be further transferred to a client interface and gain the consideration of clients' added-value. Future products were identified from among the current selection. These products meet FIOH's effectiveness criteria (universality, solution-centric, R&D connection), and they are in demand. Competition has to be managed so that FIOH products can maintain market leadership and give direction. Products should be able to respond to demand, which means that opportunities should be recognized and support for the products should be found. Active generation of client expectations with marketing communications, for example, also requires a capacity to redeem on promises made.

FIOH's competitive advantages were identified as greater resources, specified effect in certain client segments, direct and useful workplace effectiveness, long-term and client-oriented activity, good price/performance ratio, and special expertise in certain areas of substance knowledge. There is a clear need to brighten FIOH's profile and to focus on holistic concepts by exploiting the collaboration and distribution channels efficiently.

Summary of description of products on the market

Table 4.9.1 Summary of market analysis (autumn 2008). The table shows examples of products recognized with future potential presented by the product family leaders.

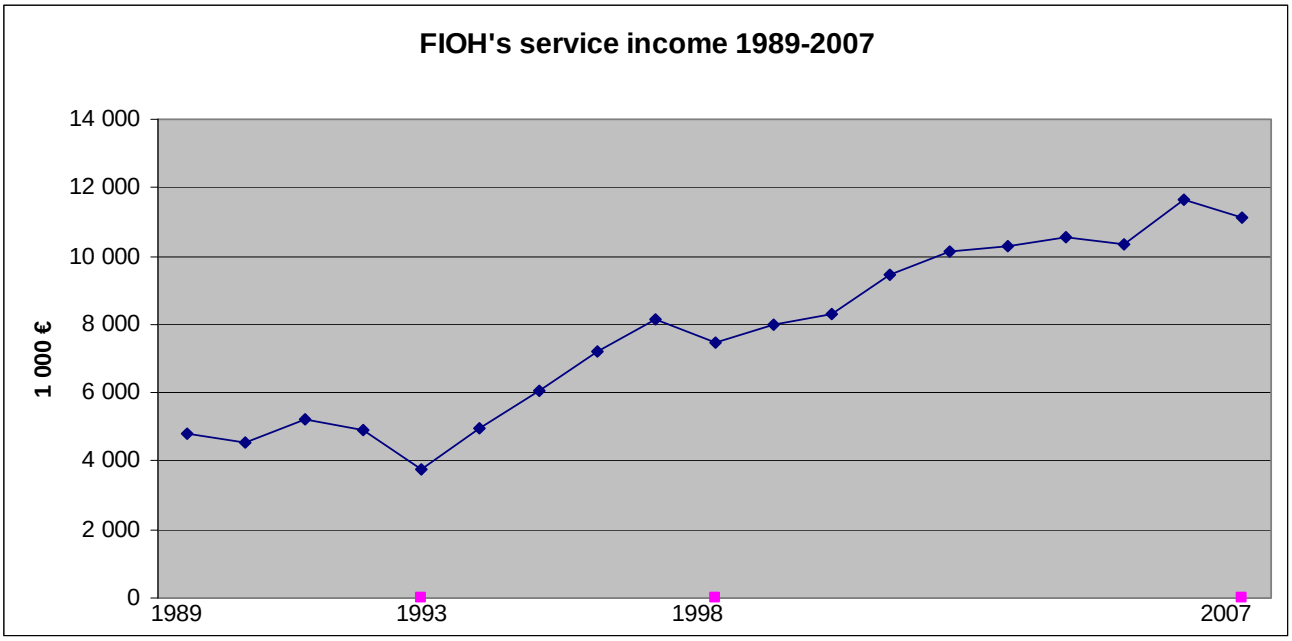
PRODUCT LINE AND PRODUCT	MARGIN	MARKE SHARE	COMPETI-TION	ROLE	DEMAND	CLIENTS
Organizational development services						
• Climate enquiry service	100 %	10 %	Manageable	Steering	Increasing	most client groups
• Aptitude assessment	100 %	10 %	Manageable	Steering	Constant	GOV, CORP, ORG, UNI
Occupational medicine services						
• Physical working and evaluation of strain in work	110 %	50 %	None	Steering	Increasing	HC, CORP
Work process and equipment development						
• Ergonomics and usability	110 %	30 %	Manageable	Steering	Increasing	CORP
• Development of work change	100 %	20 %	Manageable	Conforming	Increasing	CORP, MUN, TTH
• Working time	100 %	100 %	Manageable	Steering	Increasing	CORP, MUN, ORG, HOSP, HC
OHS Development and Health and Work ability Promotion						
• Potential	125 %	100 %	None	Steering	Increasing	all client groups
Improvement of work environment						
• REACH educational and consulting services	100 %	10 %	Manageable	Steering	Increasing	CORP
• Indoor environment services	80 %	30 %	Manageable	Steering	Constant	GOV, CORP, HOSP, HC, UNI, MUN
Training						
• Training	100 %	80-100 %	None or manageable	Steering	Constant	Many client groups

When comparing the situation in 2005 with 2008, FIOH has developed its client management and market analysis in a very systematic way according to the original plan presented in annex 1. The main changes have been the change from regional teams to national teams and operations. The common quality system to all its experts, the idea of a one-stop shop, a common CRM-system and responsibilities relating to that, new product structure, developing marketing, ideas of service and products, new productization process, better connection between research and service processes, clear client feedback collection and analysing system, a more economical way of thinking, expert-oriented service, better networking of its

multiprofessional experts, capability to see customership in a holistic way, better understanding of product delivery and new types of ideas to organize its service operations.

As a simple description of the development of FIOH's connections to Finnish working life and its clients, a curve of FIOH’s income as a function of the years 1989–2007 is presented in Figure 4.9.1.

Figure 4.9.1 Development of FIOH's service income 1989–2007.



More detailed collation and utilization of client feedback is defined in the report "Client and market analysis".

4.10 Future challenges and planned responses

Service Challenges

FIOH’s starting point for the future is the service-based strategy that takes into account the efficiency of process and added value to the client.

Developing challenges of the service are then:

- Taking client interface as a starting point in a joint development of products
- Comprehensive products, product criteria, an optimal product list, better focus
- Comprehensive management of product distribution observing b-to-b, subcontracting and cooperation
- Supporting cooperation channels as a part of the products and business
- Client relation management for a focal point in the innovation model
- Productizing linked clearer to R&D and basic operations
- Clearer product marketing and choice of clients, e.g. SMEs cooperating with different networks

- Re-organization of the service and increasing the amount of service experts.

FIOH's products should fulfil the following characters as informed in its strategy and image prospect: it is defined that FIOH should be the sole and unique - institute, which is client-oriented, reliable (”evidence-based”), neutral and ethical, anticipatory, practical, a fair partner, focused, a skilled expert and capable of renewal, as well as an exemplary workplace. Mostly, the client feedback accepted this vision relating to FIOH.

The Productivity programme, or downsizing the personnel, looks from the stand point of basic activities and the innovation model as follows:

There are three different basic mechanisms to downsizing: reduction from every team, reduction of non-strategic services and outsourcing (incorporation, closing down). Slimming down just from basic activities or moving them to other places clearly deducts the money per person. If Productivity Programme will concern FIOH, it can state as conclusion from its experiences that FIOH needs all options and new solutions to care of innovation model and workplaces' needs.

Conclusion from service activities

As a conclusion, the same facts could be stated concerning FIOH's service activities as presented earlier in the report of "Client and market analyses" by using SWOT analysis.

FIOH's main strengths and opportunities are:

- good image and reputation
- partly established service for its clients
- support and confidence of its clients, long customerships
- good multiprofessional knowledge and high educational level
- mainly research-based products
- developing service process and products
- well-motivated and devoted staff
- capability to interpretation of results
- learning from the choices of earning, IPR-knowledge
- more target-oriented choices of client groups
- systematic utilization of wide client feedback
- increasing importance of ICT-service products

FIOH's main *weaknesses* are:

- capability to see clientship entirely
- better evaluation of market potential and market demand
- significance of FIOH's innovation politics to products
- active product politics and caring of products
- low flexibility
- use of multiprofessional know-how
- decrease of its personnel, its contact to working life and its information from working life
- escape of its senior experts
- lack of holistic view of working life

Past and future responses

When comparing the situation in 2005 with that of 2008, FIOH has developed its client management and market analysis in a very systematic way according to the original plan. The main changes have been the change from regional teams to national teams and operations. The common quality system to all FIOH's experts, the idea of a one-stop shop, common CRM-system and responsibilities relating to that, new product structure, marketing development, ideas of service and products, new productization process, better connection between research and service processes, clear client feedback collection and system analyses, more economical thinking, expert-oriented service, better networking of its multi-professional experts, capability to see customership in a holistic way, better understanding of the delivery of its products and new types of ideas to organize its service operations.

In the near future (2009–2010), FIOH will continue the development according to its original plan. The operational principles are now decided, and the management information system with FIOH's new client segments idea and the responsibilities of product lines and product marketing should be arranged in practise. Also, the management of services as en bloc is one of FIOH's challenges, but now the Institute has a good starting point and capability to handle that.

5 Special R&D units

5.1 Unit of Excellence for Immunotoxicology

Summary

This research programme focuses on the exploration of key mechanisms involved in the development and maintenance of work-related allergies and other hypersensitivity disorders, e.g. allergic contact dermatitis, atopic dermatitis and asthma. Based on the in-depth knowledge on disease mechanisms programme also aims to develop immunological tools for prevention and treatment of hypersensitivity diseases. State of the art knowledge and new research techniques, including transgenic mouse models, proteomics and systems biology have been extensively used in these studies.

Unit of Excellence for Immunotoxicology has published altogether 52 peer-reviewed publications during the 2005-present. Average IF of all publications was 4.6. Nineteen publications had IF > 5; 13 publication had IF > 6 and 6 publication had IF > 8.

Five doctoral thesis projects were completed during 2005–2008. 13 thesis projects are in progress. One thesis project will be completed on spring 2008.

Unit of Excellence has received substantial external funding during 2005–2008, altogether 2 654 500 Euros. Major funding organizations for the unit are European Union, Academy of Finland, Finnish Work Environment Fund and Sigrid Juselius foundation.

Members of the unit have given 30 oral or poster presentations in international scientific meetings. More than 30 oral presentations have been given in national meetings. Unit has been involved in the organization of two international conferences. Unit has been also

involved in the standardisation of methods used for measurement of allergen content in natural rubber products in ASTM and in CEN.

There is no need to do major revision to the accepted plan. It is anticipated that the role of innate immunity in the development of the allergic and other hypersensitivity diseases will be emphasized during the years 2008-2010.

Understanding the pathomechanisms of hypersensitivity diseases is a prerequisite for their valid diagnostics and effective treatment and prevention. The results of this programme have potential to facilitate substantially the improvement of diagnosis, prevention and treatment strategies of work-related allergies and other hypersensitivity disorders.

Achievement of the goals and major scientific findings

This research programme focuses on the exploration of key mechanisms involved in the development and maintenance of work-related allergies and other hypersensitivity disorders, e.g. allergic contact dermatitis, atopic dermatitis and asthma. Based on the in-depth knowledge on disease mechanisms program also aims to develop immunological tools for prevention and treatment of occupational allergies. State of the art knowledge and new research techniques, including transgenic mouse models, systems biology and proteomics have been extensively used in these studies.

Selected scientific findings, methodological achievements and development of the research competence during the years 2005-2008 are described in the following:

I. Selected scientific findings during 2005–2008

Exposure to building dampness, often associated with growth of microbes such as *Stachybotrys chartarum*, has been linked to respiratory symptoms. Because an atopic predisposition may influence the response to microbes, we examined the effects of *S. chartarum* on allergic mice in an experimental model. Study demonstrated that exposure to the *Stachybotrus chartarum* spores has synergistic effects to the symptoms of experimental asthma and airway inflammation. Results suggest that special attention should be paid to the inflammatory status of the patients in addition to characterization microbial exposure agents. The study was published in highest ranked respiratory system journal, *American Journal of Respiratory and Critical Care Medicine magazine* (IF 9.1). Study was selected the best research article in the field of health research in year 2006 at FIOH.

Damp building-related illnesses (DBRI) have caused concern for years in many countries. Although the problem is extensive, the knowledge of the immunological reactions behind DBRI is limited. Trichothecene mycotoxins, produced by damp building molds, form one major group of toxins, which possibly contribute to the illnesses. The Unit's results show that human macrophages sense trichothecene mycotoxins as a danger signal, which activates a proteolytic signaling cascade leading to secretion of inflammatory cytokines. These results should be taken into account when trying to explain the reasons for the symptoms seen in people suffering DBRI. The study was published in *Journal of Immunology* (IF 6.3).

Patients with atopic dermatitis (AD) have repeated cutaneous exposure to both environmental allergens and superantigen-producing strains of *Staphylococcus aureus*. The Unit used a murine model of AD to investigate the role of staphylococcal enterotoxin B (SEB) in the

modulation of allergen-induced skin inflammation. Results of the experiments revealed that the cutaneous exposure to Staphylococcus toxins affects critically the development of allergic skin inflammation and IgE antibody production in an experimental AD. This study reveals important new information on how microbial toxins participate in allergic sensitization and in the development of allergic skin disease. The study was published in *Journal of Immunology* (IF 6.3).

As clinical and histological features of allergic and irritant contact dermatitis share common characteristics, the differentiation between them in the preclinical and clinical evaluations of chemicals remains difficult. The Unit identified the differences in the underlying immunological mechanisms of chemical-induced allergic or irritant skin responses. Chemical-induced allergic and irritant skin responses showed distinct molecular expression profiles. In particular, chemokine genes predominantly regulated by T-cell effector cytokines demonstrated differential upregulation in hapten-specific skin inflammation. Study provides important insights into the molecular basis of chemical-induced allergic and irritant contact dermatitis and identifies novel markers suitable for their differentiation. The study was published in the top ranked allergy journal, the *Journal of Allergy and Clinical Immunology* (IF 8.8).

Atopic dermatitis is highly pruritic inflammatory skin disease. IL-31 is a novel T-cell-derived cytokine that induces severe pruritus and dermatitis in transgenic mice. We investigated the role of human IL-31 in pruritic and nonpruritic inflammatory skin diseases. IL-31 was significantly overexpressed in pruritic atopic compared with nonpruritic psoriatic skin inflammation. Highest IL-31 levels were detected in prurigo nodularis, the most pruritic form of chronic skin inflammation. In vivo, staphylococcal superantigen rapidly induced IL-31 expression in atopic individuals. Our findings provide a new link among staphylococcal colonization, subsequent T-cell recruitment/activation, and pruritus induction in patients with atopic dermatitis. The study was published in the *Journal of Allergy and Clinical Immunology* (IF 8.8).

Macrophages are essential for the development of innate immune responses against a variety of infectious factors. They detect invading pathogens via their pattern recognition receptors such as toll-like receptors. We used 2-DE gel-based proteomics to find novel TLR7/8 target proteins in human monocyte-derived macrophages in order to improve our understanding of the virus recognition by this TLR. Proteomic analysis revealed that the activation of pattern recognition receptors of the innate immune system results in strong upregulation of manganese-containing superoxide dismutase (SOD2) gene expression suggesting that SOD2 protects macrophages from oxidative stress during microbial infection. This study was published in the *Proteomics* journal (IF 5.7).

As respiratory symptoms are common in addition to skin reactions in natural rubber latex allergy, we investigated the significance of different allergen exposure routes in the development of lung inflammation and airway hyperreactivity. Study revealed that cutaneous exposure to proteins eluting from latex products may significantly contribute to the development of asthma in latex allergy. Glove powder is the most important carrier of NRL allergens to airways and thus primary prevention has mainly focused on the use of non-powdered latex gloves. Since the exposure via the cutaneous route could be an important way for sensitizing airways, attention will need to be paid to the use of low- or non-allergen NRL gloves instead of using only non-powdered gloves. The study was published at the leading dermatology journal, *The Journal of Investigative Dermatology* (IF 4.5). The study was selected the best research article in the field of health research in year 2005 at FIOH.

Individuals with natural rubber latex allergy often have immediate reactions to plant-derived foods and fresh fruits, such as avocado and banana. IgE of these patients has been shown to bind endochitinases containing an N-terminal hevein-like domain (HLD). However, evidence on 31-kd endochitinase-induced reactions in vivo is lacking. We sought to assess the clinical significance of 31-kd endochitinases and isolated HLDs in latex-fruit syndrome. Study revealed that the isolated HLD molecules alone, but not when linked to endochitinases, seem to be responsible for IgE-mediated clinical reactions in latex-fruit syndrome. Careful selection of relevant allergens in their proper molecular form is therefore crucial in forming a reliable diagnosis of latex-fruit syndrome. The study was published in the *Journal of Allergy and Clinical Immunology* (IF 8.8)

II. Methodological achievements

Systems biology is the study of complex biological phenomena in a global manner, as opposed to classical approaches that reduce a complex system to a limited number of parameters. It seeks to integrate high-throughput biological data to understand how biological systems function. The application of systems biology in biomedical research has increased in the past decade largely as a consequence of the human genome project and technological advances in genomics and proteomics. There are several ongoing projects at the unit of excellence for immunotoxicology that utilize systems biology methods including proteomics, transcriptomics, and high-throughput screening. The unit has excellent facilities and collaborations to perform studies utilizing proteomics (see below). To perform DNA-microarray experiments and functional high-throughput screening studies the unit co-operates with The University of Helsinki High Throughput Center and Biomedicum Biochip Center, respectively.

Proteomics is one of the most promising new methods of systems biology in the identification of disease associated biomolecules and in the exploration of molecular networks underlying diseases. Unit of Excellence for Immunotoxicology has made substantial progress in the utilization of proteomics in its research. Senior Scientist Anne Puustinen is leading the proteomics group at the unit and she has set-up 2-Dimensional - Differential In Gel Expression analysis (DIGE) method to the laboratory. Gel-based two-dimensional (2D) proteomics will be utilized in the examination of nanoparticle induced inflammatory effects in cells. This recent project is lead by Harri Alenius together with Anne Puustinen at the Unit of Excellence for Immunotoxicology and funded (129 000 Euros) by Finnish Work Environment Fund. In addition, senior Scientist Sampsa Matikainen has received substantial funding (398 000 Euros) from the Academy of Finland to explore activation of innate immunity mechanisms by functional proteomics. This project is done in close collaboration with docent Tuula Nyman (Protein Chemistry Research Group, Institute of Biotechnology, University of Helsinki) and docent Tero Aittokallio (Data mining and bioinformatics group, University of Turku) to utilize proteomics and bioinformatics in the research. The aim of research consortium is to characterize activation of innate immunity by newer liquid chromatography and mass spectrometry-based proteomics methods. These methods are readily amenable for automation and high-throughput analysis of proteomes. Research consortium is also developing novel computational data pre-processing and mining tools which will accelerate the proteomics research and make the results more reliable.

RNA interference (RNAi) is a specific and efficient method to silence gene expression in mammalian cells either by transfection of short interfering RNAs (siRNAs) or by transcription of short hairpin RNAs (shRNA) from expression vectors and retroviruses.

Inventors of the RNAi methodology got Nobel Prize at 2006. Unit of Excellence utilise the RNAi methodology in the silencing of the newly described Th2 associated transcription factors in experimental asthma *in vivo*. This Sigrid Juselius Foundation - funded project (50.000 Euros) will be used to set up a platform for investigating asthma associated molecules *in vivo*. This methodology has powerful possibilities to investigate functional role of any molecule in disease models without the use of gene-targeted mice.

III. Development of research competence

Recruitment of high quality researchers is one of the most important steps in the establishment of successful research environment. Unit of Excellence for Immunotoxicology has succeeded to obtain several top-quality scientists which methodological and intellectual know-how suits perfectly to the research focus of the Unit and significantly increases its research competence.

Senior Scientist Sampsa Matikainen was recruited to the Unit at the end of the 2005. Docent Matikainen has over 15 years experience in the high quality innate immunity research. He has also outstanding skills to conduct studies regarding molecular and cellular biology and biochemistry. Moreover, he has also substantial know-how and research network in the utilisation of proteomics in his research. Dr Matikainen's know-how and methodological knowledge has significantly increased the scientific quality of the unit. His research experience has already substantially utilized in the investigation of immunological mechanisms of allergies and other hypersensitivity diseases as well inflammatory effects of nanoparticle exposure.

Senior Scientist Anne Puustinen started her work as a leader of the proteomics group in the beginning of 2007 at the unit. Docent Puustinen has strong background in the field of protein chemistry and she has published substantial number of high quality publications. She has focused recent two years on the development of 2D-proteomics in FIOH and is currently strongly involved in the investigation of nanoparticle induced inflammatory effects as well as mechanisms of allergic and other hypersensitivity diseases.

Senior Scientist Piia Karisola started her work at the Unit as a post-doctoral researcher fellow funded by Academy of Finland in beginning of 2008. Dr. Karisola visited for three years (2006-2007) in the laboratory of Prof. Dale Umetsu at the Harvard Medical School. Dr Karisola has outstanding skills especially on animal models of allergy and molecular and cellular immunology. Her knowledge has substantially strengthened the immunological know-how at the unit.

Domestic and foreign research network

Programme has extensive collaboration with several domestic universities and research institutes*:*

- HUCH, Skin and Allergy Hospital *(prof. Tari Haahtela and chief physician Mika Mäkelä)* leading clinical research and teaching hospital in the field of allergy. Active collaborator in the investigation of immunomodulatory effects of microbial exposure in the development and maintenance of allergic airway inflammation.
- Biomedicum *(prof. Jussi Taipale)*, group is a member of the Nordic Center of Excellence in Disease Genetics, and The Center of Excellence in Translational Genome-Scale

Biology of the Academy of Finland. Active collaborator in the utilization of systems biology in allergy research.

- Institute of Medical Technology, Molecular immunology group *(prof. Olli Sivennoinen, Director),* group has strong background molecular immunology. Active collaborator RNAi studies.
- Centre for Biotechnology, Molecular immunology group *(prof. Riitta Lahesmaa, Director),* group has strong background molecular immunology and systems biology of cell differentiation. Collaborator in RNAi studies.
- National Institute for Health and Welfare, Department of Environmental Health *(prof. Juha Pekkanen),* part of the centre of excellence for environmental health risk analysis. The centre's aim is to develop methods for better and more coherent risk analysis. Collaborator in studies concerning epidemiology of asthma and allergies.
- Tampere University Hospital, Department of Dermatology and Venerology *(prof. Timo Reunala ja dos. Kristiina Turjanmaa),* pioneer unit in the clinical research of latex allergy. Active collaborator in latex allergy studies.
- Institute of Biotechnology, Laboratory of Protein Chemistry *(laboratory chief Nisse Kalkkinen, group leader Tuula Nyman),* leading laboratory in the field of protein chemistry and proteomics. Active collaborator in studies requiring sophisticated protein chemistry and proteomics.
- University of Helsinki, Department of Microbiology *(prof. Salkinoja-Salonen),* part of the centre of excellence in applied microbiology research. Active collaborator in the investigation of effects of microbial exposure in airway inflammation.
- University of Turku, Data Mining and Bioinformatics Group *(group leader Tero Aittokallio),* group has substantial experience in bioinformatics. Collaborator in innate immunity studies.

Programme has also a large and active collaborative network with *international universities and research institutes*:

- Karolinska Institutet, Sweden: Department of Biosciences and Nutrition *(prof. Juha Kere),* group has strong in mapping genes behind multifactorial diseases. Active collaborator in asthma and allergy related studies. Center for Molecular Medicine, Dermatology and venereology research group (*Dr Andor Pivarcsi, Dr Enikö Sonkoly*), group investigates role of microRNAs (miRNAs) in the pathogenesis of chronic skin inflammation. Active collaborator miRNA studies.
- Harvard Medical School, Children's Hospital, USA *(prof. Geha, prof. Umetsu),* one of the leading research groups in the field of basic immunology and allergology. Collaborators in the studies utilizing murine model of atopic dermatitis and TIM-proteins.
- Neurocrine Bioscience, USA *(prof. Zlotnik),* one of the leading authors in the field of chemokine research. Collaborator in the investigation of the role of chemokines in the pathogenesis of atopic dermatitis.
- Heinrich-Heine-University, Germany: *(prof. Homey),* group is performing top level research in dermatology and cancer biology. Active collaborator in chemokine related studies. *Molecular Immunology Team (prof. Irmgard Förster),* team investigates the effects of environmental substances on the immune system. Active collaborator in the transgenic mice studies.
- INSERM, Institut Curie, Ranska *(Dr. Dieu-Nosjean),* pioneer unit in the field of dendritic cell biology. Collaborator in dendritic cell related studies.
- University of Szeged, Unkari *(prof. Kemeny),* unit is investigating the effects of microbial exposure on allergic skin inflammation. Collaborator in atopic dermatitis studies.

- The Hebrew University of Jerusalem, Israel *(prof. Francesca Levi-Shaffer),* Expert in mast cell and eosinophil biology. Collaborator in allergy research.
- Ludwig Maximilian University of Munich, Germany *(prof. Friz Krombach)* group investigates mechanisms regulating leukocyte trafficking in inflammatory disease. Collaborator in the investigation of health effects of nanoparticles.
- University of Aarhus, Denmark *(group leader Sören Riis Paludan),* group investigates mechanisms of antiviral innate immune responses. Collaborator in innate immunity studies.

Program has also collaboration with several domestic and foreign companies associated with allergy research (Schering-Plough, UCB, Dynavax, Xenova, FIT Biotechnology, LeoPharma).

Scientific productivity and quality of research

Unit of Excellence for Immunotoxicology has published altogether 52 peer-reviewed publications (list of publications is in Appendix I) during the 2005-present on the following research fields:

– Allergy and asthma - 29 publications, average impact factor (IF) 5.1
– Innate Immunity - 14 publications, average IF 4.65
– Toxicology - 4 publications, average IF 2.8
– Dermatology - 2 publications, average IF 1.8
– Gene polymorphism - 1 publication, IF 2.8
– Respiratory system - 1 publication, IF 1.65
– General medicine - 1 publication

Average IF of all publications was 4.6.

– Nineteen publications had IF > 5
– Thirteen publication had IF > 6
– Six publication had IF > 8

52 articles published 2005 and onwards by the members of the unit and found from ISI Web of Knowledge have been cited altogether 581 times. Eight articles of those were cited more then 20 times. Average Citations per article is 11.4. Members of the Unit of Excellence for Immunotoxicology (Alenius H, Matikainen S, Puustinen A) were cited altogether 3206 times during 2005-2008.

Exploitation and dissemination of research results

- Presentations in scientific conferences, symposia and workshops
  - More than 30 oral or poster presentations in international scientific meetings in the field
  - More than 30 oral presentations in national meetings
- Seminars and courses organized by the Unit of Excellence
  - Nordic Allergy Symposium in Tuohilampi, Finland 18.-21.2005 “Allergy - from Gene to Function". 80 participants from Nordic countries.
  - European NanOSH Conference – Nanotechnologies: A Critical Area in Occupational Safety and Health, 3–5 December 2007, Marina Congress Center, Helsinki, Finland. Conference had 192 participants from over 20 countries

- Publicity in the target organizations/media
  - One interview to the radio
  - Three interviews to the press
- Other exploitation and dissemination
  As a member of the natural rubber latex research group unit has been involved in the standardization of methods used for measurement of allergen content in natural rubber products
  - "Test method for immunological measurement of four principal allergenic proteins in natural rubber and its products": ASTM International Committee D11 on Rubber
  - Annex B (informative) ”Immunological methods for the measurement of natural ruber latex allergens”, p.20-26). The European Committee for Standardization (CEN), technical committee TC 205 workgroup 3 (WG3).

Potential impact

Understanding the pathomechanisms of allergic diseases is a prerequisite for their valid diagnostics and effective treatment and prevention. This research program focuses on the exploration of key mechanisms involved in the development and maintenance of work-related allergic disorders and also aims to develop immunological tools for prevention and treatment of occupational allergies. The results of this program have potential to facilitate substantially the improvement of diagnosis, prevention and treatment strategies of work-related allergies and other hypersensitivity disorders.

5.2 Unit of Excellence for Psychosocial Factors

Summary

Research training output

Adjunct Professorships 2; Doctoral dissertations 6 finished/5 in progress.

Scientific output

Original publications in international peer-reviewed journals 119 (including papers in British Medical Journal, American Journal of Psychiatry, Archives of Internal Medicine, American Journal of Epidemiology and Journal of Personality and Social Psychology); Symposiums and oral presentations in international conferences 25; Our article Kivimäki et al. J Epidemiol Community Health 2007;61:154-158 was elected as a Landmark Study within Anxiety Disorders, Mood Disorders, Occupational & Industrial Medicine, and Social & Behavioral Determinants of Health' by Faculty of 1000 Medicine.

Social relevance

Several interviews and news stories in world-wide media, including BBC World News, Reuters World Wide News, The New York Times and Newsweek, as well as in national media.

Summary of findings

Organizational justice (or fairness), a concept the Unit has launched in occupational health research, may be a crucial element of the psychosocial work environment. The Unit hypothesized that employees' interactions with their supervisors, on whom they may be highly dependent for resources and rewards, can be important for their well-being. Organizational justice involves the extent to which supervisors consider employees' viewpoints, are able to suppress personal biases, and take steps to deal with subordinates fairly and honestly.

The Unit showed a 30% lower risk of incident coronary heart disease and cardiovascular mortality among employees with high organizational justice. This protective effect was similar in Finnish and British cohorts and remained so after taking into account conventional cardiovascular risk factors, such as high blood pressure, high cholesterol and health-risk behaviours. There was some evidence that heart rate variability, a measure of autonomic function, may underlie this association. The Unit also found that high justice, and a workplace climate supporting innovation were related to a lower risk of psychiatric morbidity and lower turnover rate; problems in social relations between supervisors and subordinates were predictors of employee hospitalization for back disorders other than those of the intervertebral disc. If the observed associations are causal, these findings are of considerable public health and economic relevance, because cardiovascular diseases and mental disorders are common, accounting for over 40% of the total disease burden. Musculoskeletal disorders, in turn, are a major cause of work disability.

Organizational downsizing is a significant survival tactic for organizations in industrialized countries, but previous studies show that one unintended consequence of such an intervention can be increased work stress, and adverse changes in aspects of social capital at work. The Unit found that major downsizing was associated with significant increases in the use of antidepressants among those who remained in employment and with elevated rates of long-term sickness absence and disability pensions.

In hospitals, overcrowding and excess staff workload has been widely recognized as a serious problem for patients. The Unit showed that exposure to an average bed occupancy rate over 10 % in excess of the recommended limit was associated with new antidepressant treatment among staff. The association followed a dose-response pattern with increasing bed occupancy associated with an increasing likelihood of antidepressant use. The increased risk of antidepressant use which we observed suggests that overcrowding in hospital wards may have an adverse effect on the mental health of staff.

The majority of prior studies on social capital and health have assessed social capital in residential neighbourhoods and communities, but the question whether the concept should also be applicable in workplaces has been raised. New sources of social capital are likely to be found in settings where people spend most of their time, such as the workplace. In collaboration with Prof. Wilkinson, a leading scientist of social capital and health, the Unit developed a measure of social capital at work based on existing work survey instruments that could assess the core dimensions of social capital. Following this, the Unit demonstrated predictive associations of low social capital at work with increased depression incidence and increased use of antidepressants in a cohort of over 30 000 public sector employees. Furthermore, higher social capital at work was associated with better self-rated health and an increased probability of quitting smoking in longitudinal multilevel analysis.

Exact pathways linking various aspects of social capital at work with employee health and well-being are still poorly understood. The Unit's individual- and area-level analyses suggest that stress and health-risk behaviours are plausible mediating factors as indicators of a healthy life style seem to cluster. However, individual differences are evident: social reciprocity may have a different meaning for women and men, and our genetic analyses show that people vary in their vulnerability to the adverse effects of work stress.

Observing natural experiments may be a more feasible option than randomized controlled trials for testing whether improving social capital at work is likely to result in increased health and well-being among employees. The Unit found that a positive change in organizational justice was associated with a lower likelihood of developing health problems, psychiatric morbidity and taking sick leave than unchanged justice or a negative change in justice. These findings suggest this aspect of social capital is a promising target for organizational interventions aiming at improving employee health and well-being.

Achievement of goals and major scientific results

1. Effect of psychosocial risk factors on health

The first aim was to examine the effect of change in and cumulative exposure to both traditional and new psychosocial risk factors on self-reported health, sickness absence, depression, early retirement and mortality, and to identify potential groups at risk to health problems.

Organizational justice (or fairness) is a psychosocial concept which the Unit has launched in research on occupational health and work stress. Employees' interactions with their supervisors, on whom they may be highly dependent for resources and rewards, can be important for well-being. Organizational justice involves the extent to which supervisors consider employees' viewpoints, are able to suppress personal biases, and take steps to deal with subordinates in a fair and honest manner. Qualitative data were used to describe concrete events at work that characterize organizational justice.

In quantitative analyses, the Unit showed a 30% lower risk of incident coronary heart disease and cardiovascular mortality among employees with high organizational justice. This protective effect was similar in Finnish and British cohorts, and remained so after taking into account conventional cardiovascular risk factors, such as high blood pressure, high cholesterol and health-risk behaviours. There was some evidence that heart rate variability, a measure of autonomic function, may underlie this association. The Unit also discovered that high justice and a workplace climate supporting innovation were related to lower risks of psychiatric morbidity, and that turnover rate and problems in social relations between supervisors and subordinates were predictors of back disorders in employees. If the observed associations are causal, these findings are of considerable public health and economic importance, because cardiovascular diseases and mental disorders are common, accounting for over 40% of total disease burden. Musculoskeletal disorders, in turn, are a major cause of work disability.

Organizational downsizing (the reduction of personnel in workplaces) is a significant survival tactic for organizations in industrialized countries, but previous studies show that one unintended consequence of such intervention can be increase in work stress and adverse changes in aspects of social capital at work. The Unit found major downsizing was associated

with an increase in the use of antidepressants among those who remained in employment, and with elevated rates of long-term sickness absence and disability pensions. In our cohort, the annual incidence of disability pensions attributable to downsizing was 6 per 10 000 workers. For the pension institutions, the estimated total costs of downsizing in terms of extra early disability retirements among full-time municipal employees were estimated to be 126 million euros in the 1990s.

In hospitals, overcrowding and excess staff workload has been widely recognized as a serious problem for patients. The Unit found exposure over six months to an average bed occupancy rate over 10% in excess of the recommended limit was associated with new antidepressant treatment among staff. The association followed a dose-response pattern with increasing bed occupancy associated with an increasing likelihood of antidepressant use. The increased risk of antidepressant use which we observed suggests that overcrowding in hospital wards may have an adverse effect on the mental health of staff.

2. Behavioural and psychological links between psychosocial factors and health

The second aim was to examine the behavioural and psychological links between psychosocial factors and health. Although the relationship between psychosocial factors at work and biological diseases such as coronary heart disease is widely studied, the underlying mechanisms are not well understood.

Exact pathways linking various aspects of psychosocial work environment with employee health and well-being are still poorly understood. The Unit's individual and area level analyses suggest stress and health-risk behaviours are plausible mediating factors as indicators of social capital at work and residential neigbourhoods, lack of excessive job strain, and healthy life style seem to cluster. However, individual differences are evident: social reciprocity may have different meaning for women and men, and our genetic analyses show that people vary in their vulnerability to the adverse effects of work stress.

3. Social capital at work

The third aim was to examine the extent to which the high assets of social capital at work protect against the adverse effects of work life changes on employee well-being, and whether recent trends in work life predict changes in work-related social capital.

The majority of prior studies on social capital and health have assessed social capital in residential neighbourhoods and communities, but now the question as to whether the concept should also be applicable in workplaces has been raised. New sources of social capital are likely to be found in settings where people spend most of their time, such as the workplace. In collaboration with Prof. Wilkinson, a leading scientist of social capital and health, we developed a measure of social capital at work based on existing work survey instruments that could assess the core dimensions of social capital. Following this, the Unit demonstrated predictive associations of low social capital at work with increased depression incidence, and an increased use of antidepressants in a cohort of over 30 000 public sector employees. Furthermore, higher social capital at work was associated with better self-rated health and increased the probability of quitting smoking in longitudinal multilevel analysis.

4. Appropriate primary and secondary preventive measures

The fourth aim was to identify appropriate primary and secondary preventive measures from those used in the target organizations.

Observing natural experiments may be a more feasible option than randomized controlled trials for testing whether improving the psychosocial work environment is likely to result in increased health and well-being among employees. The Unit found a positive change in organizational justice was associated with a lower likelihood of developing health problems and psychiatric morbidity and taking sick leave, than unchanged justice or a negative change in justice. These findings suggest that this aspect of work environment is a promising target for organizational interventions aiming at improving employee health and well-being.

International and national collaboration

We have established both an international and national network of collaborations. The main collaborators are:

- The Whitehall II Study Group directed by Prof. Sir Michael Marmot and Prof. Mika Kivimäki, *Department of Epidemiology and Public Health, University College London, UK.*
- The Gazel cohort study group directed by Prof Marcel Goldberg and Dr Archana Singh-Manoux's study group, *INSERM, Paris, France.*
- Dr. Hugo Westerlund's study group, *Stress Research Institute, University of Stockholm, Sweden.*
- The HeSSup Study Group directed by Prof. Markku Koskenvuo and the Helsinki Health Study group directed by Prof. Eero Lahelma, *Department of Public Health, University of Helsinki, Finland.*
- Adjunct Professor Marko Elovainio, *National Research and Development Centre for Health and Welfare, Finland.*
- Prof. Timo Klaukka, *The Social Insurance Institution of Finland.*
- Adjunct Professor Pauli Forma, *The Local Government Pensions Institution, Helsinki, Finland.*
- Prof. T Cox's study group, *University of Nottingham, Institute for Work, Health and Organisations, UK.*
- Prof. G Davey Smith's study group, *University of Bristol, UK.*

Other collaborators include:

- Prof. Martica Hall, *University of Pittsburgh, USA* (sleep research).
- Prof. R Wilkinson, *Medical School, Division of Epidemiology & Public Health, University of Nottingham, UK* (social inequalities in health).
- Prof. Bram Buunk, *University of Groningen, The Netherlands* (social support, social networks).
- Prof. Kristina Alexanderson, *Karolinska Institutet, Sweden* (sickness absence research).
- Prof. Kees van den Bos, *Utrecht University, The Netherlands*, Prof. J. Brockner, *University of Columbia, USA,* Prof. J. Greenberg, *Ohio State University, USA* (organizational justice).
- Prof. Olli T. Raitakari, *Department of Clinical Physiology, University of Turku, Finland* (cardiovascular risk factors).

- Prof. Liisa Keltikangas-Järvinen, *Department of Psychology, University of Helsinki, Finland* (personality, individual differences).
- Adjunct Professor Pekka Virtanen, *University of Tampere, Finland* (labour market, employment insecurity, health sociology).

Scientific productivity and quality of research

During the programme of 2005-2008, the research group published 117 original articles (102 published, 15 in press), 2 reviews and 2 editorials in international peer-reviewed scientific journals. Table 1 shows the impact factors of the publications during the programme, amounting to 366. Figure 1 gives the annual number of citations for the two PI's of the programme. In 2008, for example, we were cited 800-900 times (ISI database, 4 papers cited >100). Our article "Organizational downsizing and increased use of psychotropic drugs among employees who remain in employment" (*Journal of Epidemiology and Community Health* 2007; 61:154-158) by Kivimäki M, Honkonen T, Wahlbeck K, Elovainio M, Pentti J, Klaukka T, Virtanen M, Vahtera J., was elected as the "Landmark Study within Anxiety Disorders, Mood Disorders, Occupational & Industrial Medicine, and Social & Behavioral Determinants of Health" by the Faculty of 1000 Medicine.

Exploitation and dissemination of the results

At least 25 presentations of results have been made in international scientific conferences, symposia and workshops. One chapter to popularize the results has been written for a book aimed at the mass markets (Tuula Oksanen, Jussi Vahtera, Mika Kivimäki. Liika on liikaa - stressissäkin - "Enough is enough - even stress"? In: Jussi Huttunen, Pertti Mustajoki (eds.) Elämä pelissä. Kustannus Oy Duodecim, Helsinki 2007).

Publicity in target organizations

The results related to changes in sickness absence are reported annually, and those related to survey findings, biannually, to the target organizations at the highest level (the mayor) as well as in presentations open to all employees. Moreover, survey feedback is given on a CD with a programme enabling all work units to see their own results in three repeated measurements as well as in relation to the upper hierarchical levels. In most towns it is obligatory that the supervisor discusses the results together with the subordinates, and make plans to find solutions to problems detected in these group discussions.

Publicity in media

The studies have raised interest in the world wide mass media, with news stories and interviews in: *Reuters Word Wide News Services* headlines (25 Oct 2005, 5 May 2006, 16 Jun 2006), *BBC* (25 Feb 2006), *The New York Times* (5 Sep 2004, 1 Nov 2005).

A search of media coverage following nine press releases in Finland in 2005-2007 found 242 articles in the newspapers, with a cumulative circulation of over 14.4 million readers. TV and radio programme time for these results was 36 minutes.

Organizational processes and preventive measures triggered by programme

Appendix 2 lists, by town, examples of the ways in which the organizations have taken advantage of the results. Fro example, in all big cities studied, the importance of the psychosocial work environment in relation to employee health is taken into account in the strategies of the organizations. The influence of the programme seems to strengthen with time.

Perspectives for the future

From 2008 onwards, the Unit has begun to give specific emphasis to research on the determinants of early exit from the labour market and the health trajectories from midlife to post-retirement ages. This project, funded by the Academy of Finland and the Social Insurance Institution of Finland, aims to clarify the work-related process leading to early exit from the labour market. The Unit's objectives are to examine the ways through which individual, workplace and societal level factors may exert an impact on the risk of, and recovery from short-term work disability, how these factors contribute to the transition from short-term work disability to long-term or permanent work disability, and to identify the changes in trajectories of health, functioning and health behaviour from pre- to post-retirement and the key factors shaping these health trajectories. Thus, the project also aims to deepen knowledge on the health, functioning and health behaviour of retirees, also taking into account the pre-retirement phase. This project, based on an established national and international network of collaborations, will primarily use data from the ongoing Finnish Public Sector study and Health and Social Support study (HeSSup), as well as data from two other European countries (France and Great Britain) with differing social security policies.

The Finnish Public Sector study is an ongoing prospective study among employees working in ten towns and six hospital districts. Data from national health registers from 1980 to 2005, and annual records from employers on job contracts, sickness absence, and workplace characteristics relate to 260 240 employees. Of these, 70 377 responded to the surveys conducted in 1997-1998, 2000-2002 and 2004–2005. New data will be gathered biannually.

The British Whitehall II study has been a pioneer in the field of socioeconomic inequalities in health, with its detailed assessment of daily life circumstances, the richness of psychosocial and biological data, and its meticulous follow-up of 10 308 civil servants aged 35 to 55 over 20 years 1985 onwards across 8 data waves.

The Health and Social Support (HeSSup) study is a longitudinal study on a population sample representative of the Finnish population in the following four age groups: 20-24, 30-34, 40-44, and 50-54 years at baseline. Postal surveys were conducted in 1998 and 2003, and the responses have been linked to records from national health registers up to 2005.

The Gazel cohort, established in 1989, comprises 20 625 employees of a French national gas and electricity company followed since then by annual questionnaires and register data. The 17th follow-up was conducted in 2005. By December 2005, 88% of men and 65% of women had retired.

The number of retired people is rapidly increasing in these four well-characterized cohorts, enabling more thorough research on factors affecting early exit from the workforce. Repeated measurements will make it possible to analyse changes in the measured explanatory variables at

individual and organizational levels (eg. health behaviours, psychosocial factors at work) as well as their effects on pre- and post-retirement intermediate outcomes and disease endpoints, such as cause-specific sickness absence, cognitive and physical functioning, incident diseases, disability, and mortality. Together, the cohorts will apparently form the largest dataset available to examine a wide range of factors potentially affecting both short-term and long-term work disability, and transition to retirement.

Reliable information on determinants and risk groups is essential in planning effective strategies to reduce early exit from labour force. The findings of this study will provide unique information for future policies to prevent the impending 'pensions crisis'. The teaching outcomes of the project include three PhD degrees and three Adjunct Professorships. The project enables two to three post-doctoral researchers to prepare a second doctoral thesis at University College London, UK.

Potential impact on the improvement of disease prevention and health promotion by organizational measures in the long run

Many of the Unit's findings suggest that specific aspects of psychosocial work environment, such as organizational justice and social capital at work, are a promising target for organizational interventions aiming to improve employee health and well-being. At the level of the target organizations, employing approximately one fifth of all local government personnel in Finland, continuous measurement and feedback of the main results is likely to have had a significant effect on the organizations. The Unit found that a positive change in organizational justice was associated with a lower likelihood of developing health problems, psychiatric morbidity, and taking sick leave than unchanged justice or a negative change in justice.

5.3 The Brain and Work Research Centre

Objectives

Work in a technology-rich 24/7 society and global economy is cognitively, mentally and physiologically demanding. The characteristics of information work and irregular, long working hours are common in most professions. Technological development has also enabled working independently of physical location, and advanced the development of virtual work communities that do not even share the same time zone. At the same time, the significance of life-long learning has increased. Thus today, even mild cognitive and mental impairment due to medical and non-medical factors can reduce work ability.

The Brain and Work Research Centre (BWRC) was founded in 2005. The Centre merges neuroscience and human factors research into a solid approach to the issues of work life. During the ongoing strategy period 2006–2010 of FIOH, the focus of BRWC is to study the relationship of working hours, the information environment at work, and exposure to neurotoxic substances with brain and psychophysiologic functions. The Centre aims to develop working conditions that support sufficient recovery through sleep and the optimization of cognitive and mental load. Additionally, the Centre develops methods and practices for the prevention and early recognition of cognitive impairment of individual

workers. Its current focus is on professions within transport, health care, information and communication sectors, media, and the process industry.

The ultimate goal of BWRC is to promote the compatibility of work demands with brain resources. This is carried out by work life motivated applied research, development projects and the implementation of results into practice through training and the dissemination of information. To ensure the practical value of the Centre's activities, it closely collaborates with enterprises, occupational health services (OHS) and labour market organizations. In comparison to other national brain research centres, whose focus is on basic science and clinical issues, we implement neuroscience in occupational settings. Through collaboration with other research centres, we advance the implementation of relevant basic research findings in work life.

Organization

The activity at BWRC is organized into three teams. The aims of the teams complement each other and contribute to mutual goals. The projects carried out at BWRC usually include members from all three teams.

The *Brain and technology team* (led by Kiti Müller) studies the effects of cognitive workload and vigilance on brain and autonomic nervous system physiology. It is responsible for the development of new methodological applications in the fields of cognitive neurophysiology and sleep monitoring. The team's goal is to innovate solutions supporting cognitive fitness at work. It also studies how emerging information technologies and interface solutions affect workers' neurophysiology and how they support cognitive performance in different types of cognitively complex work tasks. The team is responsible the "*Using knowledge on human neurocognition and physiology in the planning of future information work*" programme at FIOH.

The main task of the *Working Hours and Cognitive Ergonomics team* (leader Mikael Sallinen) is to study and advance the use of solutions that promote healthy working hours and information environments. The effects of sleep and ageing are two of the common denominators of our activities, as both play a significant role in cognitive fitness at work. The team is responsible for the "*Human and productive working hours"* programme at FIOH.

The *Cognition and work team* (led by Markku Sainio) provides the clinical expertise in BWRC, along with national and international expertise in work-related nervous system diseases. The team aims to implement methods and good practices through OHS. It develops methods and practices for the prevention and early recognition of cognitive impairment of workers with sleep, stress, mental disorders and toxic nervous effects, as well as interventions aiming at solving identified problems. Research findings are implemented through the dissemination of information, development projects with occupational services, and training of occupational health care professionals. Through the "*Safe and healthy professional drivers"* programme, the team aims to increase the health of professional drivers.

The three team leaders form the management group of BWRC. Its function is to define our main annual and strategy-period goals, and to ensure that the annual plans of the teams are in accordance with shared objectives. It is also operatively responsible for the allocation of resources to different activities.

Laboratory facilities

The BWRC has two laboratories. The Brainwork laboratory was founded in 1997. It includes sleep laboratories and a work simulation laboratory in which the acoustic and thermal environment can be controlled. In these facilities, studies are carried out in which various neurophysiologic measurements of brain and autonomic nervous system (ANS) function are integrated in time synchrony with computerized cognitive test batteries. The performance tests have been developed to simulate modern work characterized by multitasking and task-switching. Sleep laboratories enable studies simulating different work shifts and the effects of night sleep quality and acute or cumulative sleep debt on cognitive performance and neurophysiology.

One of the Centre's main achievements has been the construction of the new DynaMITe (Dynamic Multimodal Interaction Technology) laboratory in 2007–2008. It is now fully functional and serves two main purposes. 1) It provides a future-orientated environment for conducting research on emerging information and communication (ICT) solutions. A goal is to study their effects on the neurophysiologic state of the individual and how new applications support good cognitive performance. 2) As a semi-living lab environment and test bed it provides an intermediary step for the R&D of methods towards field studies, enabling more (naturalistic) realistic study setups to be designed and carried out. They are used to identify the most promising neurophysiologic methods; outcome measures of the brain; ANS states that are reactive to changes in internal physiologic state, and/or external work-related loading factors burdening the worker. The feasibility of different ambulatory devices is then evaluated in the DynaMITe laboratory prior to actual field studies.

Areas of expertise and research collaboration

The BWRC employs physicians, psychologists, physicists and engineers. A list of current personnel is presented in annex 1. Its areas of expertise in medicine are neurology, psychiatry, neurophysiology, sleep and traffic medicine. Clinical, cognitive, vision and neuropsychology as well as psychophysiology are represented in the field of behavioural sciences. Natural and technical sciences include medical and biophysics, technical physics, cognitive technology and usability, information and communication technology and automation.

Research collaboration with other units is extensive:

Neuroergonomics and information technology:

- In cognitive neurosciences and technology: the following two Centres of Excellence of the Academy of Finland at Helsinki University of Technology (HUT): 1) Computational Complex Systems, 2) Systems Neuroscience and Neuroimaging, and additionally the Helsinki Institute of Information Technology (HIIT).
- In cognitive neurophysiology, mental workload, medical technology and instrumentation and bioinformatics: the Department of Biomedical Engineering and Computational Science at HUT, and the Department of Physics at Helsinki University (HU).
- In vigilance, sleep quality and effects of sleep: the Department of Signal Processing at Tampere University of Technology; the Department of Neurophysiology, Tampere University; and the Department of Occupational Medicine, University of Bergen
- In the interaction of cognition and motor functions: the Faculty of Behavioural Sciences, HU

- In age and cognition: the Faculty of Behavioural Sciences; HU, the Department of Psychology, University of Turku; and the Agora Centre of University of Jyväskylä.
- In neuroergonomics and information technology: the Technical Research Centre of Finland (VTT), the Centre of Knowledge and Information research of the Helsinki School of Economics

Cognitive dysfunction and work:

- In cognition and sleep: the Finnish Sleep Consortium, HU; the Departments of Public Health, Neurology, and Physiology; and the National Institute for Health and Wellbeing, UKK Institute; the Technical Research Centre of Finland; the Skogby Sleep Clinic.
- In neurotoxicology: the Department of Clinical Neurophysiology at Helsinki University Hospital; the Coronel Institute, Amsterdam, The Netherlands; the Department of Occupational Health, Vienna, Austria.

Working hours and sleep research:

- The Centre belongs to the Finnish Sleep Research consortium. Other partners are the Department of Physiology at HU, the Department of Health and Functional Capacity and the Department of Molecular Medicine at the National Institute for Health and Welfare, and the UKK institute.
- The following research centres: the Agora Center at the University of Jyväskylä, the Department of Psychology at the University of Helsinki, the Stress Research Institute at the University of Stockholm, the Department of Occupational Medicine at the University of Bergen, and the Department of Epidemiology and Public Health at the University College London
- Most projects have included supervising master's and doctoral theses, and large projects funded by the Finnish Funding Agency for Technology and Innovation (Tekes), the Finnish Work Environment Fund and the EU. They have also included collaboration with R&D units of companies operating in the sectors of health and ICT technology development, and a wide range of companies using these new technologies or providing occupational health services.

Scientific publications, research training and external funding

A total of 121 scientific publications in peer reviewed journals, 63 other scientific publications, 26 general articles and 10 text or guide books (or chapters in books) were published between 2005 and 2008. 3 doctoral thesis and 7 Master's thesis were completed. 4 ongoing doctoral thesis and 4 Master's thesis are extimated to be completed within one year. The total amount of external research funding 2005-2010 is 3 654 865 Euros (Tekes, Academy of Finland, EU, Work Environment Fund). For details see separate annexes.

Selected achievements

Neuroergonomics

The Centre's activities are in the interdisciplinary field of neuroergonomics that combines neuroscience and human factors research. Brain physiology, cognition and behaviour are studied in the context of work.

Scientific findings and methodological development

At BRWC, we have systematically created a laboratory environment and work process in which it is possible to concurrently carry out research projects and pilot studies in which novel methodological approaches to neuroergonomics are explored. Promising methods are included in research projects after the R&D instrumentation phase. This R&D of methods is an ongoing process. The outcome of this ground work has been reported in several master's thesis (for summary see the annex of BWRC on completed thesis work).

Assessment of cognitive load and sleepiness

The BRWC has developed a computerized test battery with which the information load, number of tasks to be performed, and task presentation speed (work pace) can be modified (Sallinen et al. 2008). With neurophysiologic methods linked in time-synchrony to the test, we have shown that the EEG spectra, defined by an index we have named "brain beat", reacts to changes in the cognitive demand of the task and to the degree of sleepiness. It offers objective means to estimate the overall physiologic load of the brain and to evaluate the cognitive and mental load of work tasks (Marjamäki 2006, Holm et al submitted 2009).

We have also studied how cardiovascular parameters (representing ANS function) react to changes on cognitive load. The first results show that blood pressure, heart rate and vasoconstriction measured from the fingertip best classified mental workload. The next step will be to evaluate their usefulness at actual workplaces. (Henelius 2008)

The Centre has developed an automatic sleep stage classification based on signals recorded by electro-oculography electrodes. The self-applicable automatic sleep staging system performs large scale ambulatory sleep studies, carried out in natural environments, plausible for screening sleep disorders and investigating the relationship between irregular sleep and health. (Virkkala 2007 ja 2008)

Information technology and usability

Knowledge of the limits of human capacity for processing visual information is import in designing ICT interfaces. With the aid of eye movement studies we have shown that with a single fixation of the eyes to a certain point, 4-5 faces, 4-5 words, 30-40 characters and 30-35 computer icons can be identified. (Ojanpää 2006) For easy and fluent reading, the contrast between text and background (luminance) is a more relevant factor than pure colour difference. Concerning layout of information on computer screens, up to 4-5 words (with a total of 28-35 characters) can be processed with one eye fixation on vertical lists, whereas on a horizontal line, only 10-11 letters were processed with one gaze fixation. We have shown that visual search slows with age. However, individual variability in this is high (Lindberg et al 2006). Ideally ICT user interfaces should be adaptable to the needs of individual user needs.

Implementation into practice

EEG spectral information can be measured with only two EEG electrodes and implemented into a compact, wearable device for assessing brain state in both field and clinical settings. We have also developed a methodological tool kit consisting of subjective symptom questionnaires (on sleepiness, vigilance, task-related mental, cognitive and physiologic load), neurophysiological methods, computerized cognitive test sets and clinical medical

examination procedures. It can be individually tailored for the demands of research as well as custom-need driven service development projects.

In Finland the retirement age of air traffic controllers has been elevated from 55 to 65 years. The Civil Aviation Administration subscribed a literature review concerning ageing and cognition in which we identified research knowledge already applicable to practice and revealed areas where more research is needed in order to promote air traffic safety (Kalakoski et al 2007). This has led to further collaboration between FIOH and the Avia College, in order to find solutions to asses and support the work ability of ageing air traffic controllers.

A www-based manual on vision ergonomics provides guidelines for designing ICT interfaces that promote visual search and easy reading. We have written Finnish guide and text books on the working brain (Aivokutinaa, Müller 2008) and memory (Muistikirja, Kalakoski) as well as several general articles on the topic of the brain at work, which also address neuroergonomic aspects (e.g. Müller 2006).

Knowledge related to cognitive fitness and good overall brain performance at work is disseminated into practice through lecture activities. Audiences range from political decision-makers, corporate directors, corporate R&D executives and specialists (mainly in the areas of biomedical and information technologies), HR specialists, educators (working at different levels of the educational system), medical, occupational and public health service providers and individual workers. We also frequently have visitors at our laboratories and knowledge to the general public has been given through media visibility.

Cognitive dysfunction and work

Selected scientific findings

Our aim has been to improve the screening of workers exposed to neurotoxic substances and the early recognition of symptoms of chronic toxic encephalopathy (CSE) at occupational health care services. In many countries, difficulties in the differential diagnostics of CSE have also hampered its recognition. Thus our research has also aimed at improving CSE diagnostics.

Euroquest symptom screening and a stepwise differential diagnostic procedure was shown to be useful. The Euroquest questionnaire survey of 2000 workers identified symptomatic individuals. The clinical examination of 22 men revealed one CSE and two with other encephalopathy due to multifactorial aetiology including solvents. CSE compatible symptoms were encountered in sleep disturbances, somatic disorders, depression, unemployment, and excess alcohol use (Kaukiainen et al. 2008). Early detection and screening is most feasible with easily applicable tools such as the neurotoxic symptom questionnaire, Euroquest.

The CSE symptoms shown by Euroquest provided cut-off levels for screening and are helpful in the differential diagnostic process. A computer-assisted neuropsychological assessment of CSE revealed dysfunction in tasks demanding working memory processing. The memory deficits of CSE patients are different from preclinical and very early Alzheimer's disease, but resemble those seen in moderate to severe Parkinson's disease (Akila et al. 2006). Magnetic brain imaging findings in CSE were either normal or showed mild cortical atrophy (Keski-Säntti et al. 2008). White matter hyper intensities were associated with age and cerebellar atrophy with excessive alcohol consumption. Auditory P300-evoked potentials in CSE patients showed lower amplitudes and longer latencies (Keski-Säntti et al. 2007). Quantitative

EEG showed an increase in the frontal theta wave activity, which suggests frontal areas of the brain as the target of neurotoxicity (Keski-Säntti et al. 2008). The study on the visual system of CSE showed colour vision defects in one third of the patients (Päällysaho et al. 2007). The cases had healthy eyes, normal contrast sensitivity, central visual fields, visual-evoked potentials but reduced visual search suggesting a cortical origin of inferior colour hue sensitivity. Visual search was due to slower cognitive processing without abnormality in eye movements (Ojanpää et al. 2006).

After brain damage, rehabilitation induces cortical activity at the hemianopic hemisphere (Henriksson et al., Raninen et al. 2007), and excecutive functions of cognitive performance predict work-ability after childhood traumatic brain injury.

In our literature reviews, we found working memory is especially vulnerable to stress (Sallinen et al., 2006. Müller et al. 2007). This has guided us to study the cognitive effects of long-term stress at work and to develop applicable methods for this purpose.

Development projects and services

Guidelines for screening and the process of detecting occupational nervous system dysfunction in active workforce at risk was tested and improved in two development projects carried out in the rotogravure printing and aviation industry. A survey on the well-being and health symptoms of train drivers and traffic resulted in interventions to improve their conditions. Screening and intervention of the health risks of professional long-haul drivers were improved in a development project with an occupational health care provider. A development project in operation halls resulted in a better control of anaesthetic gases. To counteract the effects of insomnia and burnout which affect cognition, two intervention projects are ongoing in occupational health care services which aim to improve the health, well-being and work ability of information technology and TV media workers.

All diagnostics of occupational central nervous system diseases are based in the Helsinki Unit. We provide neurological, neuropsychological and psychiatric clinical evaluations (ca. 250/year) and expert panels (for ca. 100 cases/year) for suspected cases of occupational nervous system disease, mainly hand-arm vibration syndrome and CSE, and the assessment of driving or work ability in cognitive and neuropsychiatric conditions.

Dissemination of information and training

The clinical expertise and research findings on adverse occupational effects on the nervous system are disseminated to occupational health care professionals through the guidelines for screening in occupational health services (we have written several chapters of the text book "Terveystarkastukset työterveyshuollossa" - Health checks in occupational health services). All nurses and physicians who specialize in occupational health care are nationally trained to recognize these effects. The Euroquest neurotoxic symptom questionnaire with cut-off values is provided free of charge on our website and is widely used. Through training we have also implemented guidelines for the prevention, detection and early intervention of alcohol and drug use (2 courses yearlyannually), the age-related visual burden in computer work (1 course per year), cognitive dysfunction especially in sleep or mental disturbances (1 course per year) and on the prevention of work ability of professional road drivers (2 course per year). On sleep disorders, stress, the cognitive requirements of driving and environmental sensitivity, we have written two chapters for Finnish text books and six articles for Finnish medical journals.

Two physicians specializing in occupational health for six months at FIOH are under the supervision of clinical specialists at the BWRC.

Working hours and recovery through sleep

Selected scientific findings

One of our aims has been to explore the relationship of shift work to health. In an epidemiological study we showed that shift work accelerates the atherosclerotic process in young men (< 40 yr of age), which may explain the reported elevated risk of coronary heart disease (CHD) in shift work (Puttonen et al. in press). Another underlying mechanism is elevated systolic blood pressure that increases the CHD risk more in shift work than in day work (Virkkunen et al. 2007). In two intervention studies we found that ergonomic shift planning is a preventive measure for ill-health effects from shift work. For example, a quickly clockwise rotating shift schedule decreases sleepiness (Härmä et al. 2006; Viitasalo et al. 2008), and having control over one's own working hours lowers systolic blood pressure (Viitasalo et al. 2008).

Inevitable consequences of shift work and long working hours are inadequate and disturbed sleep. We have reported that a decrease in self-reported sleep duration has taken place in Finland, especially among working-age men (Kronholm et al. 2008), and that short habitual sleep duration and frequent use of hypnotics/tranquilizers are associated with a higher risk of mortality (Hublin et al. 2007). In another study we found that poor sleep quality is associated with life dissatisfaction (a proxy of depression) (Paunio et al. 2008).

The consequences of sleep loss can be severe in terms of occupational health and safety. According to our study, even one restricted night sleep can lead to significant impairments in the cognitive functioning critical to performance in safety-sensitive occupations (Sallinen et al. 2008). A short rest pause without sleep does not markedly alleviate the situation (Sallinen et al. 2008). This finding emphasizes the significance of opportunities to nap while working under sleep loss. We also found that a five-day partial sleep loss results in immunological changes and these changes remain even after two recovery nights (Wessel et al. in press). If sleep deprivation becomes chronic the immunological changes may increase the risk of cardiovascular diseases. In all, our findings emphasize the significance of remedies such as ergonomic shift planning and "on-the-job" measures that minimize the build up of sleep loss and sleepiness.

Implementation into practice

The forest industry, and the transportation and health care sectors have been the main target groups of our implementation efforts. In the forest industry, we have advanced the use of rapidly clockwise rotating shift systems. During 2006-2007, these systems were tested in 18 productions units in paper mills and 6 of them have now decided to adopt them. In the health care sector, we have promoted ergonomic shift-planning in irregular shift systems. For example, the City of Helsinki Health Centre has adopted the concept of ergonomic shift-planning as a means of promoting well-being at work. In the transportation sector, our goal has been to reduce driver sleepiness by introducing the concept of fatigue management. The aim is to commit both the employees and employers to the use of working hour solutions and other means that support driver alertness. A new opening has been a collaboration project with the occupational health care unit of the Finnish Broadcasting Company (YLE) in which

we also test the feasibility and effectiveness of the cognitive-behavioural treatment of insomnia in a group of workers with irregular working hours.

These results of implementations have been based on the production of high quality research knowledge. Having the expert status in the field of working hours and sleep research, we have been able to create sector- and workplace-tailored development, training, and consultation projects through which relevant research knowledge has been implemented in practice. In these projects, we have mainly collaborated with the representatives of labour markets, work organizations and occupational health service producers. Examples of our collaborators are the biggest Finnish trade unions for trained practitioners of health, the Civil Aviation Administration, the Finnish electricity generating public company, and the Petroleum Safety Authority of Norway. Most of these projects have been participatory in nature and some of them have produced working hour models that have been adopted for use in other work organizations. Popular books, booklets, guidebooks and media visibility have been other avenues for implementing research knowledge into practice. The main purpose of the dissemination of information has been to raise public awareness of healthy and productive working hour solutions and of the significance of sleep.

Future challenges

The main challenge in the area of working hours is to develop industry-specific solutions that are based on organizational and individual flexibility, and the knowledge of human psycho-physiological limits. One of the most important industries will be road transport, in which the size of the companies is predominantly small, competition is intense, and fatigue-related risks are notable. While the main health hazards of irregular working hours are fairly well-established, there is a need for intervention and follow-up studies on the suggested health-promoting effects of new and more ergonomic shift systems.

In the area of sleep research, the main objectives will be to investigate *a)* individual and age-group differences in response to restricted sleep and irregular sleep-wake rhythm, *b)* feasible "on-the-job" countermeasures for sleepiness, *c)* the relationship between sleep and work stress and *d)* feasible treatments for disturbed sleep in occupational health care units. With this knowledge it is possible *a)* to develop working hour models that allow for individual differences, *b)* to reduce the number of fatigue-related occupational accidents, especially in the transport sector, *c)* to exploit the data of sleep quality when preventing, identifying, and treating chronic work stress, and *d)* to treat sleep disturbances in occupational health care units.

In the field of neuroergonomics and ICT, ever smaller devices have high data processing capacity and are capable of performing tasks that are ever more complex. With the emergence of multisensory applications, research knowledge on how humans use their auditory and visual as well as tactile sensory systems when operating these devices is needed. Today, a wall may have an embedded touch sensitive display and a floor may measure the pulse of a fallen patient. Improvements in camera technologies are able to track the gestures of a user allowing the use of immense video screens from afar.

The DynaMITe laboratory is tuned for conducting neuroergonomic research on these emerging ubiquitous technologies. It will be carried out in collaboration with the R&D units of ICT corporations and those enterprises whose workers are users of the new devices. An example of the need for this kind of approach is the SAWUI (Supporting situational awareness in demanding operating conditions through wearable multimodal user interfaces)

project, funded by Tekes (Finnish Funding Agency for Technology and Innovation), where the BWRC will study how wearable user interfaces can help in improving situational awareness in demanding, high fidelity operation situations (crisis management, fire and rescue services). An example of a study in this project is the use of small head/spectacle mounted displays.

Due to successful actions in our society, work-related nervous system disease has been minimized. The tools developed enable us to recognize workers at risk for CSE even without occupational health services. The main focus is now directed onto implementation of early recognition and intervention of burnout, sleep and mental disorders in occupational health services, for workers at risk of work inability. This requires ongoing method development to study and recognize cognitive adverse effects of harmful psychosocial stress, burnout and insomnia. We aim to provide occupational health services with efficient tools to improve the health of workers in cognitively demanding tasks.

Concerning the R&D of methods for neuroergonomics, the transition from strict laboratory settings to real work environments poses new challenges. In laboratory conditions, it is possible to record a vast number of physiological signals, whereas field studies typically only allow a subset of signals to be recorded. Rigorous focusing on bioinformatics and data mining in order to produce analysis tools of multiparametric data is needed. The aim is to identify the best outcome parameters of neurophysiologic measurements, cognitive performance tests, and subjective symptoms (questionnaires) to be used in field studies. It is quite possible that, depending on the issues to be addressed, different methodological tool kits are needed.

Straightforward, unobtrusive and efficient methodological applications are needed in field studies. The R&D activity on lightweight, user-friendly portable medical and IT devices is good, but the emerging technologies need validation. This is the current crucial step in the R&D chain. The chosen methods should provide the best possible picture of the state of the brain and autonomic nervous system. Selecting the best applications is a challenge, and requires close collaboration with companies developing these systems.

The implementation of new approaches into work life, for estimating the neuroergonomics of work and identifying factors that burden workers, as well as studying the effects of interventions on worker well-being and work flow, requires collaboration with labour unions and employer representatives. Readiness to use new technical innovations at workplaces is also needed, as is the commitment to use the produced knowledge for fixing identified problems. Ethical questions need to be addressed. Advances in the field of neuroergonomics should not be used for discrimination of workers, thus it is important that FIOH has a leading role in this area of R&D.

We are currently actively participating in negotiations aimed at founding a large national Strategic Centre for Science, Technology and Innovation on health and well-being. One of its main aims is to link the high quality research of universities and institutes with corporate R&D units and service providers operating in the health sector. The goal is to produce new technological innovations, knowledge and services for this sector. Promoting brain health in work life is one of the key areas represented in the preliminary work packages. In this new type of collaboration we need processes that aid decision-making concerning e.g. immaterial property rights, commercial product development and the public, non-commercial exploitation of R&D outputs.

5.4 Musculoskeletal Centre

Summary

Research training output

1 docentship, 4 completed doctoral dissertations, 14 in progress.

Scientific output

103 scientific papers in peer-reviewed journals, including the American Journal of Epidemiology, American Journal of Human Genetics, Annals of the Rheumatic Diseases, Occupational and Environmental medicine, Pain and Spine. Award for the Best Back Study in the annual competition of the Finnish Back Society in 2005, 2006 and 2007. Award for the best intervention study of the Finnish Institute of Occupational Health in 2008.

Social relevance

Etiologic research on musculoskeletal disorders will provide information about the potential benefit of various approaches in prevention, i.e. what the potential is in health promotion, ergonomic improvements, and work organisational improvements. Intervention studies will give more accurate knowledge about the efficacy and cost-effectiveness of various types of interventions. The results of the Early part-time sick leave project may affect legislation concerning part-time daily allowance, and how the legislation is implemented at Finnish workplaces.

Summary of findings

Associations of physical workload factors, work organisational factors and lifestyle factors with musculoskeletal disorders were addressed in population studies. In the Health 2000 Study among working-age Finns, we found a dose-response relationship between the cumulative years exposed to working with hands overhead more than one hour per day and shoulder tendinitis. Insulin-dependent diabetes was the strongest individual risk factor. A prospective study on chronic shoulder syndrome, carried out in conjunction with the Health 2000 Study on the earlier Mini-Finland cohort, showed that exposure to several physical factors, such as heavy lifting, repetitive movements, awkward postures and vibration, showed a remarkably high risk of chronic shoulder syndrome. The adverse effects of physical work load factors were seen even among those older than 75 years at follow-up. For the risk of lateral epicondylitis, we saw an interaction between repetitive movements of the arms and forceful work activities. Carpal tunnel syndrome was associated with the use of vibrating tools and exertion of high handgrip forces in the most recent job. Joint effects were seen between several physical exposures.

When comparing random samples of middle-aged female dentists and teachers, we found that at least mild radiographic osteoarthritis (ROA) was more prevalent in the non-dominant hand among the teachers, whereas at least moderate ROA was more common in the right-hand thumb and the index and middle fingers among the dentists. Further, the dentists with a history of low work task variation had a higher prevalence of ROA in the thumb, index, and middle fingers, compared with dentists with high variation. Being overweight was linearly associated with symptomatic DIP ROA, but not with ROA without pain. The relationship was accentuated in overweight subjects both at the age of 25 and at the time of the examination.

The role of physical activity and inactivity was addressed among adolescent subjects in the Oulu Back Study. Being physically very active was associated with consultations due to back pain in both boys and girls, and prolonged sitting with self-reported neck, shoulder and back pain in girls. Adolescents typically engage in several different sport and exercise activities, which seemed to protect from the harmful effects of single sports at 16 years. In the same study population, we observed also an association with smoking and low back pain with pack years of smoking showing an exposure-response relationship among girls. Isometric trunk muscle strength was not associated with low back pain symptoms.

Systematic reviews and original studies were carried out on the associations of lifestyle factors and a set of cardiovascular risk factors with musculoskeletal disorders. We found, particularly in working male samples and of the total adult population in Finland, an association between measured levels of serum cholesterol (total and LDL cholesterol) and triglycerides with incident radiating low back pain and clinically assessed sciatica, allowing for several possible confounders. Also, smoking, being overweight, and high blood pressure seem to increase the risk of future low back pain. To directly test the association between atherosclerosis and sciatica, we studied a subsample of the Health 2000 population to whom measurements of carotid artery intima-media thickness (a measure of general atherosclerosis) had been performed by ultrasound. Carotid intima-media thickness was associated with continuous radiating low back pain and with a positive unilateral clinical sign of sciatica among men. These findings are in accordance with the hypothesis that atherosclerosis of the lumbar vessels may lead to impaired nutrition of the spinal tissues and to e.g. disc degeneration.

We evaluated possible associations of collagen, aggrecan and IL1 genes polymorphisms with lumbar disc degeneration in middle-aged men, representing three occupations: machine drivers, construction carpenters, and office workers. Our results provide additional support for the role of the aggrecan gene, especially the VNTR polymorphism, in intervertebral disc degeneration and suggest that the effect of the COL9A3 gene polymorphism on disc degeneration might be modified by the IL-1beta gene polymorphism.

We also studied the role of genetic factors in the etiology of hand ostoearthritis among middle-aged female dentists and teachers. Our results also implicate a role for intragenic variation in the aggrecan, interleukin 6, vitamin D receptor and COL2A1 genes in hand OA. Further, we found that the COL2A1 gene polymorphisms may play a role in the etiology of hand OA, and that this effect may be enhanced by repetitive loading work tasks, as an increased risk associated with the intron 33 minor allele carriage was attributable to the dentists, and an interaction was observed between the intron 33 minor allele carriage and low task variation history in dental work.

Various types of ergonomic interventions are often recommended to reduce musculoskeletal disorders, but evidence for their effectiveness is sparse. To determine whether advice and training on working techniques and assistive devices prevent back pain in jobs involving manual material handling, a systematic review using the Cochrane Collaboration methodology was undertaken. The review did not show evidence that advice or training in working techniques, with or without assistive devices, is effective for preventing back pain or consequent disability. The findings challenge current widespread practice of advising workers on correct lifting technique.

A cluster randomised controlled trial was conducted during 2002-2006 in 119 municipal kitchens with 500 workers. The workers were guided to identify strenuous work tasks and to

seek solutions for decreasing physical and mental workload. After the intervention, more than 400 changes had been implemented in the intervention vs. 80 in the control group. The changes in ergonomics were perceived to decrease physical load and improve musculoskeletal health. No effects were, however, seen in the occurrence of and trouble caused by musculoskeletal pain, local fatigue after work, or sick leave due to musculoskeletal disorders during the intervention and in a 12-month follow-up. Yet, a decrease in load handling during the intervention was associated with a decrease in the occurrence of shoulder pain in the end of the intervention. The intervention tended to have an adverse effect on psychosocial factors at work, especially in the two municipalities that launched a major reorganisation of the food services during the study. The study results indicate that an intervention may put an extra burden on the workers and that the improvement of "microergonomics", like in this study, does not seem sufficient in the prevention of musculoskeletal morbidity.

Exploitation and dissemination of results

About 25 book chapters were authored by the researchers of the Centre. They also chaired the groups for two national evidence-based treatment guidelines (repetitive strain injuries, neck pain). Educational material and guidelines were also prepared for visual display work. Good practices in ergonomics have been developed in various industries and gathered into the internet pages on ergonomics of the Institute. A very frequently visited webpage "Good practices in kitchen work" was developed in parallel with the intervention study in communal kitchens. The researchers of the Centre are frequent lecturers in courses of the FIOH, and two regular courses for occupational health professionals, viz. the Upper extremity workshop and Management of sickness absence, were introduced by the Centre. The Centre has provided expertise for occupational disease legislation and evaluation of reseach activities, both nationally and internationally.

Introduction

Musculoskeletal disorders make up with mental disorders the commonest cause of work disability pensions and are associated with a major absenteeism. Repetitive strain injuries make up about 40% of all suspected or verified occupational diseases. The active workforce is ageing in Finland, due to ageing of the population and the current trend of people to retire at a higher age than previously. The ageing of the workforce emphasises the significance of musculoskeletal disorders as a potential threat to the ability to work.

To meet the growing demands for musculoskeletal expertise, the Musculoskeletal Centre was established within FIOH for the period of 2005-10. The tasks of the Centre are the early identification, prevention and treatment of musculoskeletal disorders. To enable this, improved diagnostic tools and more accurate information about risk factors, especially dose-response relationships, are needed as well as valid and feasible methods to assess exposure. The Centre collaborates with the units with musculoskeletal research activities within the Institute and coordinates the research and development activities of the Institute. It develops educational activities related to the prevention of musculoskeletal disorders and takes part in the production of textbooks and guides.

The Musculoskeletal Centre was established in the beginning of 2005, and its core resources were allocated in the Department of Occupational Medicine. After the reorganisation of the Institute, the core resources were placed in the Team of Musculoskeletal Disorders. From the beginning of 2008, the Team of Musculoskeletal Disorders and the Team of Work-Related Diseases were merged, and the core resources were placed under the new team.

Achievement of the goals, major scientific results

Role of physical, psychosocial and individual factors in musculoskeletal disorders

Associations of physical workload factors, work organisational factors and lifestyle factors with musculoskeletal disorders were addressed in population studies. In the Health 2000 Study among working-age Finns, we found a dose-response relationship between the cumulative years exposed to working with hands overhead more than one hour per day and shoulder tendinitis. Insulin-dependent diabetes was the strongest individual risk factor. A prospective study on chronic shoulder syndrome, carried out in conjunction with the Health 2000 Study on the earlier Mini-Finland cohort, showed that exposure to several physical factors, such as heavy lifting, repetitive movements, awkward postures and vibration, showed a remarkably high risk of chronic shoulder syndrome. The adverse effects of physical work load factors were seen even among those older than 75 years at follow-up. For the risk of lateral epicondylitis, we saw an interaction between repetitive movements of the arms and forceful work activities. Carpal tunnel syndrome was associated with the use of vibrating tools and exertion of high handgrip forces in the most recent job. Joint effects were seen between use of vibrating tools and exertion of high forces, between forceful activities and repetitive movements, and between repetitive movements and the use of vibrating tools. Lateral epicondylitis and shoulder disorders were more prevalent in the dominant than non-dominant side.

The first results were published from the Prospective Upper Extremity Study, carried out in collaboration with the research department (SHARP) within the Washington Department of Labor & Industries. The prevalence of clinically defined rotator cuff syndrome was associated with shoulder flexion over 45° over 15% of work time and forceful work movements. Of psychosocial factors, job insecurity and structural constraints at work were associated with rotator cuff syndrome.

When comparing random samples of middle-aged female dentists and teachers, we found that at least mild radiographic osteoarthritis (ROA) was more prevalent in the non-dominant hand among the teachers, whereas at least moderate ROA was more common in the right-hand thumb and the index and middle fingers among the dentists. Further, the dentists with a history of low work task variation had a higher prevalence of ROA in the thumb, index, and middle fingers, compared with dentists with high variation. The degree of ROA was closely associated with pain, analysed jointwise. Allowing for ROA, the anatomic localisation within the hand and hand laterality were associated with pain. Being overweight was linearly associated with symptomatic DIP ROA, but not with ROA without pain. The relationship was accentuated in overweight subjects both at the age of 25 and at the time of the examination.

The role of physical activity and inactivity was addressed among adolescent subjects in the Oulu Back Study, which is a subcohort of the Northern Finland Birth Cohort 1986. Being physically very active was associated with consultations due to back pain in both boys and girls, and prolonged sitting with self-reported neck, shoulder and back pain in girls. Adolescents typically engage in several different sport and exercise activities, which seemed to protect from the harmful effects of single sports at 16 years. In the same study population, we also observed an association with smoking and low back pain with pack years of smoking showing an exposure-response relationship among girls. Isometric trunk muscle strength was not associated with low back pain symptoms.

To summarise research on the associations between life-style factors, such as weight-related factors, smoking and physical activity, with musculoskeletal disorders, a series of systematic reviews are underway using modified Cochrane quality criteria. The reviews on sciatica and shoulder disorders have been completed. Lumbar radicular pain or sciatica was associated with being overweight, a long smoking history, high physical activity and a high serum C-reactive protein. For shoulder disorders, we saw a consistent association with diabetes, some associations with weight-related factors as well as a possible preventive effect from physical exercise and sports. These results suggest that, in addition to mechanical factors, metabolic factors play a role in the etiology of low back and shoulder disorders. A commentary was requested about the topic of the shoulder review by the International Atherosclerosis Society and published on their website.

Obesity, smoking and low physical activity are known risk factors of cardiovascular disorders. Some studies have addressed the association of a wider set of cardiovascular risk factors in low back disorders, including serum lipids. We found, particularly in male samples of the working and of the total adult population in Finland, an association between measured levels of serum cholesterol (total and LDL cholesterol) and triglycerides with incident radiating low back pain and clinically assessed sciatica, allowing for several possible confounders. Also, smoking, being overweight, and high blood pressure seem to increase the risk of future low back pain. To directly test the association between atherosclerosis and sciatica, we studied a subsample of the Health 2000 population to whom measurements of carotid artery intima-media thickness (a measure of general atherosclerosis) had been performed by ultrasound. Carotid intima-media thickness was associated with continuous radiating low back pain and with a positive unilateral clinical sign of sciatica among men. These findings are in accordance with the hypothesis that atherosclerosis of the lumbar vessels may lead to impaired nutrition of the spinal tissues and to e.g. disc degeneration.

Genetic epidemiology studies were carried out in low back disorders using both a candidate gene approach and linkage analysis. We performed the first linkage analysis ever made on sciatica and found a susceptibility area on chromosome 21q. Using a case-control design, we analysed a set of cytokine polymorphisms and observed a haplotype GGGA of interleukin-6 (*IL6*) gene being 5-fold over-represented in sciatica patients. In a follow-up study, those sciatica patients with the GGGA haplotype were prone for continuing back and leg pain symptoms and sick leaves related to them. There was a suggestive interaction between the GGGA haplotype and physical workload, where subjects with the GGGA haplotype and a physical job had low back symptoms and sick leaves over the 3-year follow-up period. We also evaluated a set of cytokine polymorphisms in an occupational cohort consisting of train engineers and sedentary paper mill workers. A polymorphism in the promoter area of *IL1A* gene was significantly associated with the disc disease phenotype, which was defined using Latent Class Analysis clustering. Moreover, whole-body vibration had an additive effect on the genetic factor.

We performed a systematic review, together with Danish researchers, on endplate and bone marrow signal changes, i.e. Modic changes, visible on magnetic resonance imaging (MRI). The review showed that these changes are frequent in patient populations, their prevalence increasing with age. On the basis of this systematic review, Modic changes are associated with low back pain. Genetic factors of Modic changes were studied among middle-aged working males. Genetic variations in the *IL1* gene cluster and the matrix metalloproteinase-3 gene were significantly associated with type II Modic changes. In the same study population, we evaluated the determinants of Modic changes in comparison to determinants of severe disc degeneration. The determinants in these two entities were different to some extent. Modic

changes were associated, besides age, with weight-related factors, whereas whole-body vibration was the only significant determinant of severe disc degeneration (besides age).

We evaluated possible associations of collagen, aggrecan and IL1 genes polymorphisms with lumbar disc degeneration in middle-aged men, representing three occupations: machine drivers, construction carpenters, and office workers. Our results provide additional support for the role of the aggrecan gene VNTR polymorphism in intervertebral disc degeneration and suggest that the effect of the COL9A3 gene polymorphism on disc degeneration might be modified by the IL-1beta gene polymorphism.

We also studied the role of genetic factors in the etiology of hand ostoearthritis among middle-aged female dentists and teachers. Our results also implicate a role for intragenic variation in the aggrecan, interleukin 6, vitamin D receptor and COL2A1 genes in hand OA. The presence of G alleles at common *IL-6* polymorphic promoter loci was associated with more severe DIP OA outcomes, i.e. symmetrical and symptomatic. Carrying a haplotype with the G allele in three promoter SNPs increased the risk of symptomatic DIP OA more than four-fold, and carriage of the G-G diplotype indicated an increased risk of both symmetrical and symptomatic DIP OA. Our results also suggest that a certain number of tandem repeats (the most common A27 allele) of the aggrecan gene VNTR polymorphism provides for optimal functioning of the aggrecan molecule, and alleles shorter or longer than this may predispose subjects to the disease. Moreover, we observed a joint effect of low calcium intake and *VDR* polymorphisms on symmetrical hand OA. Further, we found that the *COL2A1* gene polymorphisms may play a role in the etiology of hand OA, and this effect may be enhanced by repetitive loading work tasks, as an increased risk associated with the intron 33 minor allele carriage was attributable to the dentists and an interaction was observed between the intron 33 minor allele carriage and low task variation history in dental work.

We studied the natural course of local and radiating low back pain (LBP) among a sample of metal industry employees, re-examined at 5, 10, and 28 years from the baseline. LBP was found to be persistent/recurrent among 65 to 88% of the sample. The occurrence of LBP increased as the cohort aged. Of those without local LBP at the baseline, 33, 37 and 64%, and of those without radiating LBP, 17, 22, and 46%, had pain at the 5-, 10-, or 28-year follow-ups, respectively. The odds ratio of local LBP at the 5-, 10-, or 28-year follow-up for those with such pain at the baseline vs. not were 6.0, 4.7, and 4.0. The respective figures for radiating LBP were 8.5, 6.7, and 2.3. Frequent or radiating LBP, clinical findings, and back-related absenteeism at the baseline tripled the risk of hospitalisation due to low back disorders during the 28-year follow-up.

In a collaborative study with Göteborg University and the Swedish National Institute for Work Life, we studied work participation and factors associated with work participation among subjects with spinal cord lesions. The work participation rate in the Swedish spinal cord lesion population is about two-thirds of that of the healthy population (50% against 75%). Medical problems associated with the spinal cord lesion were related to work participation among men but not among women. The results of the workplace intervention study showed that the working conditions of persons with a spinal cord lesion can be improved by ergonomic measures.

Development of good intervention practices and assessment of the efficacy of interventions

Various types of ergonomic interventions are often recommended to reduce musculoskeletal disorders, but evidence for their effectiveness is sparse.

To determine whether advice and training on working techniques and assistive devices prevent back pain in jobs involving manual material handling, a systematic review using the Cochrane Collaboration methodology was undertaken. Six randomised trials and five cohort studies met the inclusion criteria. The review did not show evidence that advice or training in working techniques with or without assistive devices is effective for preventing back pain or consequent disability. The findings challenge the current widespread practice of advising workers on correct lifting techniques.

A cluster randomised controlled trial was conducted during 2002-2006 in 119 municipal kitchens with 500 workers. The workers were guided to identify strenuous work tasks and to seek solutions for decreasing physical and mental workload. After the intervention, more than 400 changes had been implemented in the intervention vs. 80 in the control group. According to a systematic evaluation, the intervention was successfully implemented. The changes in ergonomics were perceived to decrease physical load and improve musculoskeletal health. No effects were, however, seen in the occurrence of and trouble caused by musculoskeletal pain, local fatigue after work, or sick leave due to musculoskeletal disorders during the intervention and a 12-month follow-up. Yet, a decrease in load handling during the intervention was associated with a decrease in the occurrence of shoulder pain in the end of the intervention. The intervention tended to have an adverse effect on psychosocial factors at work, especially in the two municipalities that launched a major reorganisation of the food services during the study. The study results indicate that an intervention may put an extra burden on the workers, and the improvement of "microergonomics", like in this study, does not seem sufficient in the prevention of musculoskeletal morbidity.

Another randomised controlled trial on the early prevention of work-related upper extremity disorders was started in the beginning of 2006, and recruitment was completed at the end of 2007. In this trial, the employee and occupational health service together assess the work loading and agree with the employer about the changes to be made at the workplace. Possible work modifications include changes in work ergonomics, in the mode of working or other work arrangements. The main outcome is sick leave days due to upper extremity disorders, and other outcomes include functional capacity of the upper extremity, quality of life and productivity loss after the intervention. The main results will be available in 2009.

A third randomised study was started in 2007 to assess the feasibility and effects of early part-time sick leave in musculoskeletal disorders. Part-time sick leave is an official option in many countries. In Finland, part-time sick leave was introduced in the beginning of 2007 as a means to return to work after 60 days of sickness allowance. It has been discussed whether the benefit should be available already at the onset of work disability. Our hypothesis is that if work time is temporarily reduced and the work load adjusted at the early stages of disability, employees with MSDs will have less disability days and a faster return to regular work duties than employees on a conventional sick leave. At present, we have managed to recruit a sufficient study base to carry out the study. Preliminary results will be available in 2010, and the project will be completed in 2011.

To evaluate the accessibility of workplaces for employees with physical disabilities, a computerised method was developed and made publicly available on the internet pages of the Institute. Moreover, a databank of good practices for accessibility was gathered. Good practices for accessibility have also been developed for the needs of elderly people. The ergonomics and usability of electronic multichannel pipettes were developed in collaboration with their producer.

Development of diagnostic and functional assessment methods

The Work Physiatry Clinics were established in 2006 in Helsinki and in 2008 in Oulu as part of the Clinic for Occupational Diseases. The activities of the Clinics consist of the development of diagnostic methods and good practices for workplace interventions. Patients of the randomised trial on early prevention of work-related upper extremity disorders and also in the part-time sick leave study were examined and recruited for the study at the Clinics. A previously-developed, computerised standardised physical examination protocol for the examination of the neck, shoulder and low back in primary care was further developed to include the upper extremities and utilised in the trials. Ultrasound equipment was used to assess the tendons locally. Metabolic factors, such as e.g. the endothelial function, have also been measured with ultrasound equipment. Research into new inflammatory factors, carried out with the Unit of Excellence for Immunotoxicology, has given promising perspectives for finding early biomarkers of soft tissue upper extremity diseases. The associations of these new inflammatory mediators with different types of disorders as well as their prognostic capacity are currently being analysed.

A consensus document on the methods to assess functional capacity in common health disturbances was prepared in collaboration with the Finnish Medical Society Duodecim and the Finnish Pension Alliance TELA. A medical specialist of the Centre participated in the portion on low back disorders.

Development of methods for the assessment of physical workload

Musculoskeletal disorders are common in prolonged computer use. The dynamics of the relationship between musculoskeletal outcomes and duration of computer use is a challenge for statistical modeling. Data on simultaneous direct measures of computer usage and questionnaire-diaries of discomfort ratings were analysed using singular value decomposition. The proposed methodology can be utilised to also investigate the dynamics of other types of time-varying exposures and their responses.

An international collaborative project was initiated to gather and systematically document observation methods for the assessment of physical exposures into a publicly available database. The usability and reliability of the methods for different purposes will be further assessed by the experts and will serve as a basis for national recommendations.

Achievement of goals

Overall, in the area of epidemiologic research, goals were met, and the number of publications turned out to be even higher than expected. The intervention studies have been carried out as planned. The predominantly negative results are to be seriously considered when future workplace interventions are designed. For the diagnostic studies, data has been gathered, and the results will be available within 2 to 3 years. In the area of assessment of physical work exposures, the suggested team was not established in the reorganisation of the Institute, resulting in smaller resources than were planned, and the termination of the activities of the Laboratory of Biomechanics. Educational material was prepared as planned.

The work of the Centre contributes especially to the strategic goals of "Assessment and management of risks", "Management of sickness absence and prevention of the inability to work" and "Utilisation of biomedicine in the management of work-related allergies and musculoskeletal disorders". It is generally perceived that the Centre and the subsequent

reorganisation of the Institute both have enhanced collaboration between the teams and knowledge centres. Closely collaborating teams within FIOH include Musculoskeletal Disorders, Work-relate Diseases, Biological mechanisms and Prevention of Work-related Diseases, Unit of Excellence for Immunotoxicology, Ergonomics and Usability, Occupational Medicine, and Knowledge Transfer in Occupational Health and Safety.

Scientific productivity and quality of the research

The researchers within the Centre have published 103 scientific articles related to the prevention of musculoskeletal disorders (98 published, 5 in press). The papers consist of 11 reviews, 88 original communications and 4 other contributions. The journals, in which these papers have been published, are listed with their impact factors in Appendix 5. Figure 5.4.1 represents the number of scientific papers and total impact factor by publication year, and Figure 5.4.2, the average impact factor per publication year. The number of publications has almost tripled in three years, and the average impact factor of 2.7 of the publications can be considered high for the research area.

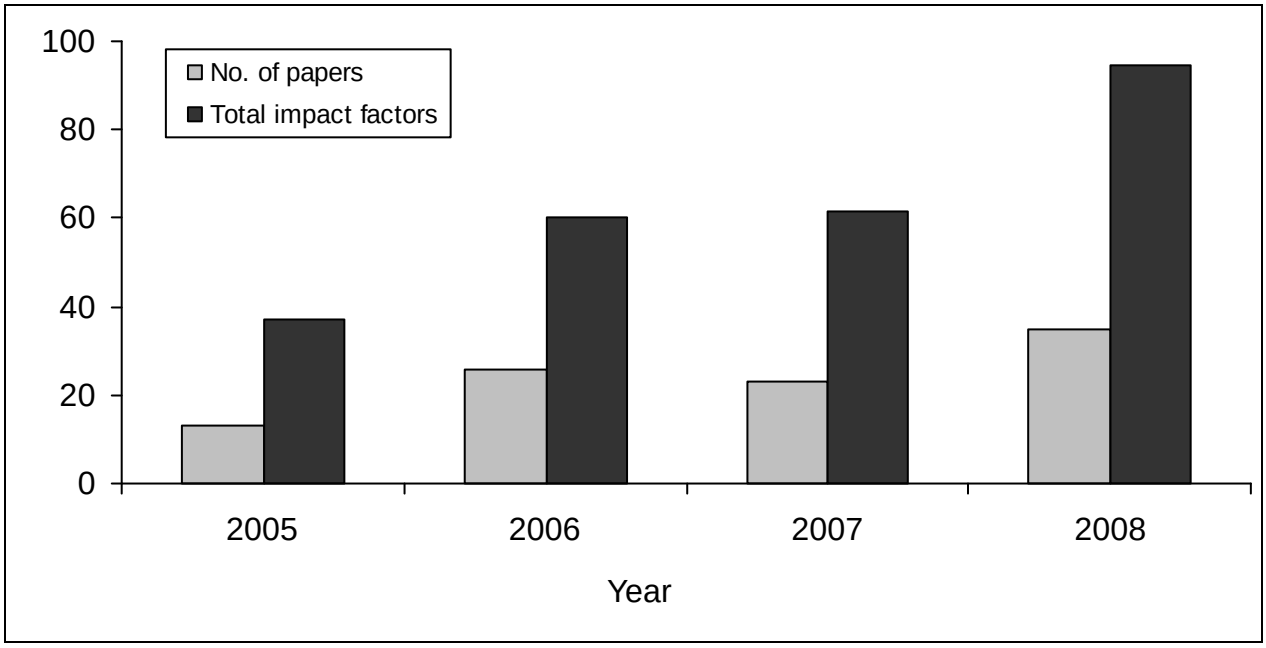


Figure 5.4.1: Number of published articles and their total impact factors by publication year.

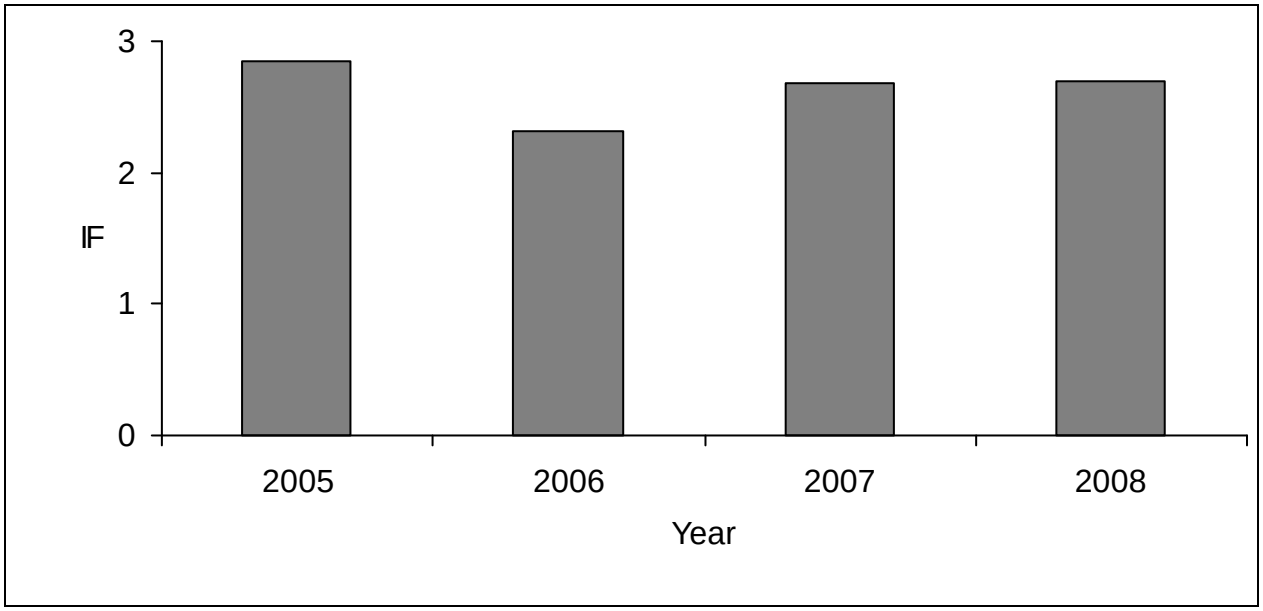


Figure 5.4.2: Average impact factor of papers by publication year.

- The paper by Kaila-Kangas L, Kivimäki M, Härmä M, Riihimäki H, Luukkonen R, Kirjonen J, Leino-Arjas P. Sleep disturbances as predictors of hospitalisation for back disorders-a 28-year follow-up of industrial employees (Spine 2006;31: 51-6) won the prize of the best back study of the Finnish Back Research Society in 2005.
- Iita Virtanen won the same prize in 2006 with the paper Virtanen IM, Noponen N, Barral S, Karppinen J, Li H, Vuoristo M, Niinimäki J, Ott J, Ala-Kokko L, Männikkö M. Putative susceptibility locus on chromosome 21q for lumbar disc disease (LDD) in the Finnish population (J Bone Miner Res. 2007;22:701-7).
- The paper by Shiri R, Viikari-Juntura E, Leino-Arjas P, Vehmas T, Varonen H, Moilanen L, Karppinen J, Heliövaara M. The Association between carotid intima-Media thickness and sciatica (Seminars in Arthritis and Rheumatism 2007;37: 174-81) won the same prize in 2007.
- Dr Kari-Pekka Martimo won the prize of the Best Presentation in the competition of the best back study of the Finnish Back Research Society in 2008 with the paper Martimo KP, Verbeek J, Karppinen J, Furlan AD, Takala EP, Kuijer PP, Jauhiainen M, Viikari-Juntura E. Effect of training and lifting equipment for preventing back pain in lifting and handling: systematic review (BMJ. 2008;336:429-31). This review was the topic for an editorial in the British Medical Journal; it appeared as a short report in the Finnish Medical Journal Duodecim, and was cited extensively in the Back Letter. It was cited in the Daily News, and prompted international interviews in two Canadian newspapers and Dutch Television.
- The paper by Haukka E, Leino-Arjas P, Viikari-Juntura E, Takala E-P, Malmivaara A, Hopsu L, Mutanen P, Ketola R, Virtanen T, Pehkonen I, Holtari M, Nykänen J, Stenholm S, Riihimäki H. Could a participatory ergonomics intervention prevent musculoskeletal disorders? A randomised controlled trial (Occup Environ Med. 2008;65:849-56) won the prize for the best intervention study in 2008 within the Finnish Institute of Occupational Health.

Exploitation and dissemination of the results

Guidelines and educational activities

The researchers of the Centre played a key role in the preparation of evidence-based treatment guidelines for repetitive strain injuries of the hand and forearm in collaboration with the Finnish Medical Society Duodecim and the Finnish Association of Occupational Health Specialists. In conjunction with the guidelines, an internet-based video tutorial on physical examination of the upper extremitites was prepared in collaboration with Duodecim. The guidelines and the video material have served as tutorial material in education, and this work prompted a very popular annual course "Upper Extremity Workshop" organised by the Institute since 2005.

The evidence-based treatment guideline for neck pain, prepared by a group chaired by the head of the Centre, is being updated and will come out in 2009.

The researchers of the "Early part-time sick leave" project have actively disseminated information about the pilot study on feasibility. The project has raised the interest of the media and appeared in the principal newspapers and the Journal of the Finnish Medial Association. Many articles have appeared on the internet and personnel journals of the participating companies. Another well-attended annual course, entitled "Management of sickness absence", was initiated by the project group in 2006.

About 25 book chapters were authored by the researchers of the centre for the Finnish textbook on work-related diseases, Handbook of the General Practitioner, Textbook on physiatrics and Handbook of epidemiology. Moreover, one international book chapter appeared about pathomechanisms and inflammatory mediators of sciatic pain.

The researchers of the Centre started a continuing seminar on musculoskeletal disorders for physicians specialising in occupational health as part of joint education with Helsinki University and the National Public Health Institute. An internet-based tutorial was prepared for future seminars, including an interactive task of handling a patient case.

Teaching of ergonomics was developed and new educational material produced in collaboration with teachers in the social work and health care institutes. Educational material and guidelines were also prepared for visual display work. Good practices in ergonomics have been developed in various industries and gathered into the internet pages on ergonomics of the Institute. The webpages for "Good practices in kitchen work" have been very frequently visited.

Expert activities

The researchers of the Centre reviewed the literature on the work-relatedness of epicondylitis and carpal tunnel syndrome by request from the Confederation of Injury Insurance Companies. The head of the Centre was appointed as Panel Member to a group preparing revision for the legislation on occupational diseases in Norway. She acted also as Panel Member in the International Evaluation of the Swedish Work Environment Research and as Prioritisation Committee member for the Swedish Council for Work life and Social Research.

The researchers of the Centre represent the Institute in the Suomen Tule ry, a national collaborative organ aiming to enhance networking between decision makers, researchers, citizens, patient organisations and producers of services, in order to promote musculoskeletal

health. They participated in the planning of the national Musculoskeletal Program for the years 2008-15. The Program goals were published in a seminar in the Parliament ("TULE-Parlamentti") at the end of 2007, attended by decision makers, experts and actors in the field. The Institute has also a representative in the Finnish League Against Musculoskeletal Disorders, a co-operative body of organisations dealing with musculoskeletal diseases, including both health care professionals and people suffering from the disorders.

Perspectives for the future

The systematic reviews on the associations between lifestyle and inflammatory factors and low back pain and osteoarthritis will be completed. Meta-analyses will be carried out for studies with homogeneous outcomes and exposures.

Etiological research will mainly utilise three population study data:

The Health 2000 Study

This is the largest population study (N=7000) and representative of Finnish adults. The Musculoskeletal Project Group has been chaired by researchers of the Centre. The physical examination encompasses the most important work-related musculoskeletal syndromes. Information about health is exceptionally rich with extensive questionnaire data and relevant laboratory and genetic assessments. Work-related exposures and work history have been assessed in detail with interviews. The cohort that has been examined in 2000-2001 will be followed via the Hospital Discharge Register and the National Insurance Institution registers. A follow-up interview and examination have been planned to be carried out in 2010, in which the Centre will participate and already has partial funding.

The Oulu Back Study

In a cohort study on subjects born in the Oulu region in 1985-6 (N=3000), the risk factors for incident low back pain problems will be studied. Among others, the socioeconomic background in childhood, life style factors, performance at school, work load, accidental injuries and psychosocial factors, as well as some candidate genes and blood lipids, are the focus of interest. The low back outcome is based on symptoms, clinical examination and magnetic resonance imaging (N=560) of the spine. The aim is to do a long follow-up of up to 20-30 years.

The LASERI Study (The Cardiovascular Risk in Young Finns Study)

The Cardiovascular Risk in Young Finns Study is an on-going follow-up study of atherosclerosis risk factors and precursors from childhood to adulthood. The study has been carried out in five Finnish university cities (Helsinki, Kuopio, Oulu, Tampere and Turku) and their surrounding municipalities. Subjects who participated in 1980 (N=3 600) have been invited to later examinations. The follow-up studies, carried out in 1986, 2001 and 2007, include questions on low back pain. A total of 2 800 (78 %) subjects participated in 1986, 2 600 (76 %) in 2001 and 2 200 (65 %) in 2007. The material provides a possibility to study common risk factors for cardiovascular and musculoskeletal disorders, and the three measurement periods allow the testing of atherosclerosis-related hypothetical models for the development of radiating and local low back pain with e.g. path analysis.

A research consortium (MSDs@Lifecourse) was newly established by the FIOH, consisting of researchers from the Turku University Central Hospital and University of Turku, University of Tampere, University of Oulu, University of Rotterdam, National Public Health Institute, and the Research Centre of Military Medicine of Finnish Defence Forces, with funding recently received from a highly competitive research program of the Academy of Finland called Responding to Public Health Challenges (SALVE), for the years 2009-12. Using three major representative study populations (Young Finns Study, Health 2000, North Finland Birth Cohort 1986), the research consortium aims at identifying the relative roles of modifiable and non-modifiable risk factors in musculoskeletal disorders. To test the consistency of results, findings obtained in one representative population will be looked at in another population. The datasets will be synthesised in meta-analyses to provide reliable estimates of the effects of work exposures, lifestyle, and genetic factors. Biomarkers will serve in understanding the mechanical pathways for disease development. New approaches, such as Mendelian randomisation and pathway analysis, will be applied in the assessment of modifiable factors in low back disorders.

In intervention research, data of on-going intervention studies will be carefully analysed with regard to both feasibility of the interventions and their efficacy and cost-effectiveness. New approaches and paradigms of interventions will likely be needed in the future.

The diagnostic studies will look at the diagnostic accuracy and predictive validity of clinical tests, as well as the role of metabolic and inflammatory biomarkers.

We will update the Current Treatment Guidelines in collaboration with the Finnish Medical Society Duodecim. The guideline on neck pain will be updated during 2009 and the guideline on repetitive strain injuries of the hand and forearm within some years.

In the area of assessment of physical work exposures, we will focus on the systematic documentation and critical evaluation of existing methods. In the large population studies, exposure information from Health 2000 and the Oulu Back Study will be translated to the Young Finns Study via a job exposure matrix.

The implementation of the research results will be carried out in close collaboration with the Team of Ergonomics and usability. New knowledge will also be spread via courses arranged by the Centre for occupational safety and health specialists and also other actors at workplaces. The Centre will also provide expert services to the newly established Centre of Occupational Medicine.

Potential impact of activities in the long run

Etiologic research on musculoskeletal disorders will provide information about the potential benefit of various approaches in prevention, i.e. what the potential is in health promotion, ergonomic improvements, and work organisational improvements.

Intervention studies will give more accurate knowledge about the efficacy and cost-effectiveness of various types of interventions in primary and secondary prevention, and about the feasibility in various approaches in designing and carrying out interventions. The majority of intervention studies focus on the secondary prevention of musculoskeletal disorders, and the part-time sick leave study aims at enhancing an early return to work.

The development of diagnostic tools and methods of exposure assessment will provide the occupational health service with evidence-based methods in the prevention and treatment of musculoskeletal disorders.

Musculoskeletal disorders make up a major cause of work disability pensions in Finland, and they cause almost 40 % of all days of the daily allowance paid by the National Insurance Institution. In some areas of industry, they account for up to one-half of all sickness absence days. Good musculoskeletal health is one of the prerequisites of good functional capacity, which in turn is a cornerstone of good work ability. The reduction of work disability due to musculoskeletal disorders will have a major economical impact. In some cases, the main diagnosis of sickness absence changes from musculoskeletal disease into a mental disorder after a longer sickness absence period. Prevention of musculoskeletal disorders and associated disability, and enhancement of early return to work may not only prevent permanent disability due to musculoskeletal but also may prevent mental disorders. Finally, good musculoskeletal health is a prerequisite for being physically active. Therefore, prevention of musculoskeletal injuries and diseases has a major public and occupational health impact in the prevention of obesity, the metabolic syndrome, and major general diseases.

The Musculoskeletal Centre has had the status of a collaborative network, with core resources placed first within a department and at the moment within a team. In the current situation, the Centre is the only body responsible for the development of research in musculoskeletal disorders.

6 International and EU Activities of FIOH in 2006–2008

The Finnish Institute of Occupational Health has put a great deal of emphasis on international collaboration from the very beginning of its establishment, because a small country needs the results and resources of others, but can also contribute to the collaboration in specific fields of its own strong expertise areas. Occupational health and safety has been one of those fields in Finland.

The previous International Evaluation Group (2004) concluded the following:

20. Collaborations of FIOH experts in projects of the Nordic countries and the European Union are benefiting both Finland’s workers and those in other countries. FIOH should continue to encourage these collaborations. The EU Framework Programmes constitute an important source of research funds, and the opportunity to work with international colleagues to address problems facing all nations.

21. FIOH is highly valued by both WHO and ILO for the work of FIOH’s staff on the many levels needed by these organizations: research, technical assistance, advice, conferences, policy development, capacity building, and information dissemination. The IEG strongly encourages FIOH to continue its coordination with the Ministry of Social Affairs and Health and the Ministry of Foreign Affairs in supporting this international work, as the work of FIOH and of other developed countries is critical for addressing the needs of developing countries and the entire global village.

6.1 International collaboration

FIOH Strategy for International Affairs

The strategy of FIOH for international affairs in 2005–2010 was approved by the Executive Committee on 21 November 2005, and it concerns both international and EU collaboration. As a sector-based institute, FIOH carries out international collaboration also on behalf of the government and in collaboration with the Ministry of Social Affairs and Health and the Ministry for Foreign Affairs. The priorities and guiding principles for the work are:

- Support for the foreign policies of Finland, as well as to the Ministry of Social Affairs and Health priorities, and implementing FIOH strategy also internationally
- Support to the implementation of WHO and ILO global strategies on occupational health and safety
- Participation in the EU system-level development and R&D collaboration; participation in standardization, preparation of OSH regulations and good practices at workplaces; increasing the impact of FIOH in the collaboration
- Support to strengthening of infrastructures, training of OSH experts, and provision of information support in cooperation countries as well as in Finland
- Provision of training opportunities to Finnish OSH experts through international programmes, projects, research activities and international meetings
- Support to the objectives of Finland in collaboration within neighbouring areas, Northern Dimension Partnership and the Baltic Sea Region
- Continuing support for Nordic collaboration in selected substantive areas, in exchange for information, and in the planning of joint priorities
- Participation in collaboration with developing countries together with the Ministry for Foreign Affairs and International Organizations, focusing geographically on East Africa and South-East Asia.

The general framework of FIOH’s international collaboration is shown in Figure 6.1.1. According to the bullet 1, the priorities of Finland are taken into account in all activities. Close collaboration with the Ministry of Social Affairs and Health is carried out in the neighbouring areas and within the Northern Dimension Partnership in Public Health and Social Well-being in particular, as well as in efforts to support the work of the International Organizations. Joint efforts with the Ministry for Foreign Affairs are implemented primarily in the collaboration with developing countries and in the neighbouring areas of Finland. In addition, one of the mainstreaming features is to utilize the existing structures and networks as effectively as possible, and to encourage and enhance their joint efforts for the development of workers' health and improvement of working conditions throughout the world.

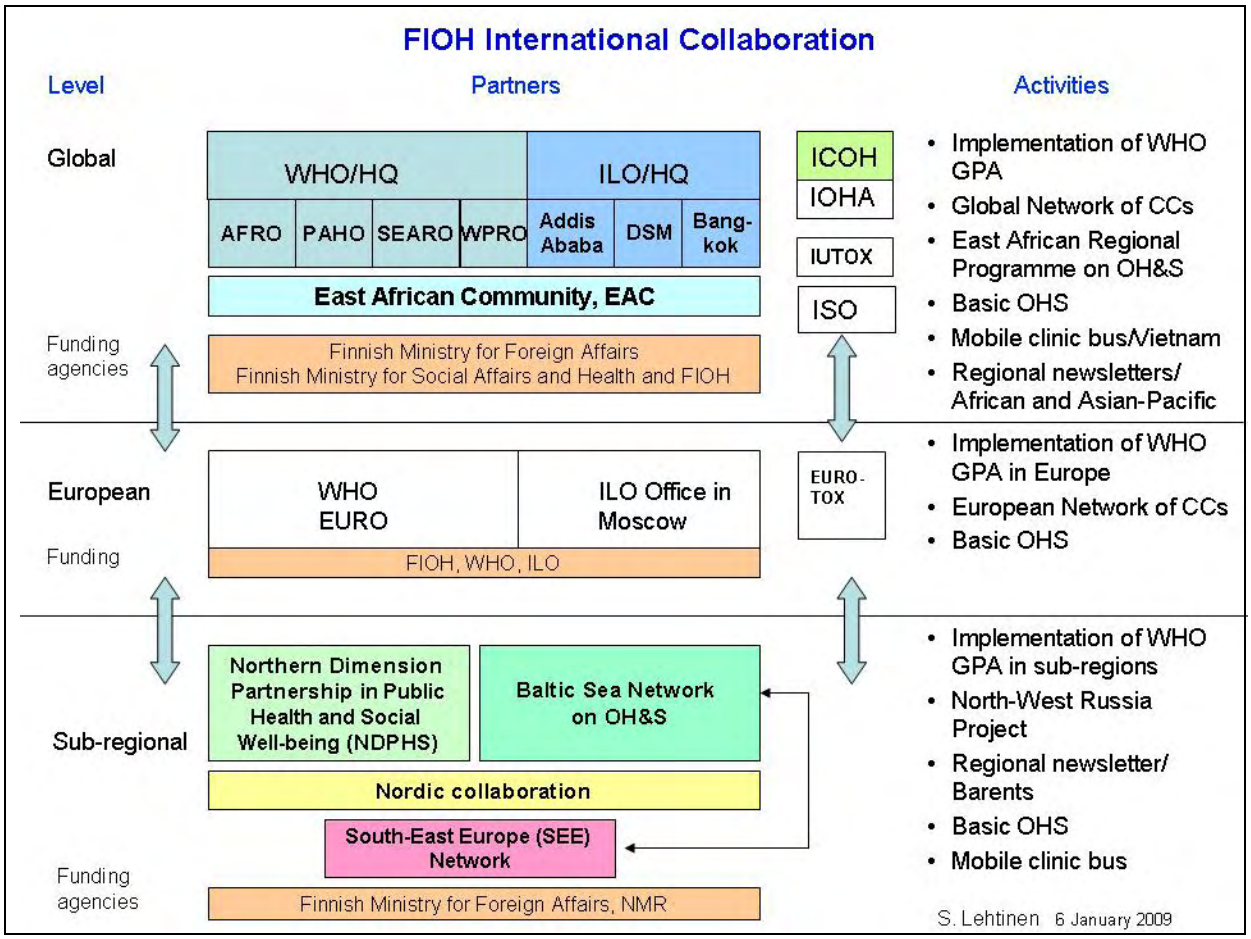


Figure 6.1.1 FIOH international collaboration at various levels. (The size of the boxes does not represent the volume of the activity).

Organization, resources

On the basis of FIOH legislation, one of the tasks of FIOH is to participate in international cooperation in its sector.

International collaboration is led by the Director General. The practical activities are currently handled in two lines: EU collaboration on one hand and international collaboration on the other. The follow-up of progress in various activities is reported back to the Executive Committee once a year. The larger programmes (East African Regional Programme and North-West Russia Project) each have a project group that meets once a month. In early 2009, a working group on international collaboration was established which aims at selecting the priorities for the next FIOH Strategy concerning the international activities of the Institute.

The personnel resources of FIOH allocated to international collaboration in 2006–2008 have been as follows:

Table 6.1.1 Personnel resources for international collaboration, person years.

	2006		2007		2008	
International collaboration	Office of Int Aff	Centres of Expertise	Office of Int Aff	Centres of Expertise	Office of Int Aff	Centres of Expertise
	3	5	3	4	3.25	5.5

Main outputs 2006–2008

Support to WHO and ILO collaboration

Support to WHO strategies

FIOH has been a WHO Collaborating Centre since 1973. In 2006 and 2007, FIOH contributed to the preparation of the WHO Global Plan of Action on Workers' Health (GPA) which was endorsed by the World Health Assembly in May 2007. Thereafter, all preparatory work has been directed to draw up the work plans at various levels for the implementation of the Global Plan of Action. This has been done under the leadership of the WHO/HQ Occupational Health Programme and WHO/EURO Occupational Health Programme. FIOH also had an opportunity to contribute to the joint meeting of WHO/HQ and WHO/AFRO in August 2007 that planned the implementation of the Global Plan of Action in the African Region.

In addition, FIOH is one of the seven members of the Planning Committee of the Network; this is an advisory group to support the work of the WHO HQ Occupational Health Programme and the Network. In 2008, the Planning Committee worked for streamlining the new Network Work Plan.

WHO Collaborating Centre Networks in Occupational Health

FIOH has also contributed to the work of the WHO Collaborating Centre Networks, at both global and European levels from the very beginning of their establishment. In the previous WHO Collaborating Centre Network Work Plan (2006–2010, Activity Area 5: Development and Expansion of Occupational Health Services), as well as in the new Work Plan 2009-2012, FIOH has assumed the responsibility for coordinating the activities of Objective 3: Development of Occupational Health Services. This also includes activities for launching the Basic Occupational Health Services (BOHS) and has called for collaboration with ICOH. This coordinating work has provided a forum for joint development of the occupational health service infrastructure and service provision system in various countries, and has initiated projects aimed at the development of BOHS in the countries. The long-term goal is to ensure access to basic occupational health services to all working people.

The Global Network held its seventh meeting in Stresa, Italy in June 2006. In March 2007, the European Network of WHO Collaborating Centres in Occupational Health held its fifth meeting in Buxton, UK. In the Report Recommendations, closer collaboration of WHO, ILO and the EU was called for which resulted later in 2007 in a joint meeting that was held in connection with the Northern Dimension Partnership in Public Health and Social Well-being (NDPHS) OSH Forum. The joint meeting discussed coordinating and strengthening of the actions of the International Organizations in collaboration with national actors. This coordination is also strongly encouraged by the NDPHS Strategy on Health at Work. In

2006–2008, FIOH has also contributed to the Networks by serving as Rapporteur of the meetings.

New topics are also continuously taken onboard and discussed within the WHO Collaborating Centre Networks. In December 2007, FIOH organized a brief consultation of the WHO Collaborating Centres in Occupational Health with the theme of occupational health and safety in nanotechnologies. A similar follow-up meeting is planned for August 2009, to be organized in connection with the International NanOEH Conference.

FIOH participates in the work of a WHO Collaborating Centre on Mental Health, which is a joint venture of STAKES, the National Public Health Institute in Finland, and FIOH.

WHO Network of the National Contact Persons in the Ministries of Health – European Region

The WHO Regional Office for Europe established in 2005 a Network of the National Contact Persons in the Health Ministries, with the aim to support the strengthening of the development of occupational health and safety in the 53 European countries. In 2008, FIOH participated in the planning and implementation of the First European Meeting of the National Contact Persons in the Ministries of Health, together with the Ministry of Social Affairs and Health and the WHO Regional Office for Europe. The aim of the meeting was to draft the commitments of the European countries to the implementation of the WHO Global Plan of Action at the country level. The Meeting was held on 22–23 September 2008 in Helsinki. The Report of the Meeting was drafted by a FIOH representative. The second meeting will be organized in September 2009 in Skopje.

Practical implementation of the WHO Global Plan of Action

FIOH works closely with the WHO/EURO in the implementation of the Global Plan of Action in the European Region. The collaboration takes place directly between the WHO/EURO and FIOH in various meetings and consultation activities, within the European Network of Collaborating Centres in Occupational Health, within the Baltic Sea Network on Occupational Health and Safety, as well as within the Northern Dimension Partnership in Public Health and Social Well-being.

FIOH support to IPCS and IARC

FIOH is active in the preparation of the International Chemical Safety Cards (ICSC) of the IPCS. Two experts of FIOH contribute to the preparation and evaluation of the ICSCs. A FIOH representative has worked as the Scientific Editor of the ICSCs since 2002. FIOH has also provided statements to several IPCS CICAD documents. In 2007, FIOH hosted a WHO CICAD meeting, and in April 2008, an ICSC evaluation meeting. A number of Institute experts also contribute to the expert meetings of the International Agency for Research on Cancer in Lyon, and one of the experts is a member of the Scientific Council of IARC.

One Institute expert works in the WHO/FAO Pesticide Evaluation group.

Support to ILO OSH Strategies

FIOH has been an ILO Collaborative Institute since the 1970s. The work on OSH profiles was started as a joint effort of International Organizations and at FIOH in 2001 (http://www.ttl.fi/Internet/partner/tf13/WHO+and+EURO+Country+Profiles+Development/Background+Document+2001/. It continued in 2001 and 2002 as preparation of 22 European country profiles (http://www.ttl.fi/Internet/partner/tf13/WHO+and+EURO+Country+Profiles+Development/Pilot+Survey+of+Twenty-two+European+Countries+in+2002/, as well as regional and sectoral profiles together with selected developing countries.

Although it is clear that it is not possible to directly compare the countries due to cultural differences, the profiles nevertheless provide a basis for self-development, further discussion and planning. In 2006, the ILO Labour Conference endorsed the Promotional Framework Convention No. 187, in which one of the key issues is the preparation of a National OSH Profile. It is expected to lead in a systematic and stepwise manner to the development of National OSH Programmes. In 2004, ILO had requested that the Finnish Ministry for Social Affairs and Health prepare a Finnish National OSH Profile according to an outline provided by ILO. The Ministry commissioned FIOH to prepare the profile. The profile was produced in a small working group. The main author is Professor Jorma Rantanen, and the group also had a representative from the Ministry and FIOH. The National Occupational Safety and Health Profile of Finland was published as a joint publication of the Ministry and FIOH in May 2006, immediately before the ILO Labour Conference. It is available on the web as a concise version (80 p.) and as a broader analytical report (198 p.).

http://www.stm.fi/Resource.phx/publishing/store/2006/05/aa1155885585766/passthru.pdf
http://www.stm.fi/Resource.phx/eng/subjt/safet/publi/publicateng.htx.i1229.pdf

The printed booklet was distributed to the participants of the ILO Occupational Safety and Health Conference. After the 2006 ILO Labour Conference, a number of delegations from various countries have visited Finland and FIOH in order to obtain more information about the profiling work. The publication has served as a model for other countries which have started the process of preparing their own national profiles. According to the ILO SafeWork Programme Manager, it is continuously sent to those who ask for a model when starting to prepare the national OSH profile.

The preparation of the National OSH Profiles was taken as a starting point also in the NDPHS Strategy (described in the Neighbouring Area collaboration), and for the preparation of regional OSH profiles in the related Framework Project that is being carried out by FIOH in North-West Russia. The preparation of sectoral profiles is one of the elements in the East African Regional Programme.

FIOH support to ICOH activities

The International Commission on Occupational Health, ICOH, is the oldest professional organization in FIOH's field. Several FIOH experts are active within ICOH. Four chairs and two secretaries of the 35 ICOH Scientific Committees are from FIOH. These are: Health Services Research and Evaluation in Occupational Health (Secretary), Occupational and Environmental Dermatoses (Chair), Occupational Health and Development (Chair), Occupational Health in Small-scale Enterprises and the Informal Sector (Secretary),

Occupational Health Nursing (Chair), and Radiation and Work (Chair). A FIOH expert has also served on the Board of ICOH (2006–2008), as well as in ICOH Information activities.

Collaboration with developing countries

The East African Regional Programme on Occupational Health and Safety

FIOH has worked together with the East African countries since the beginning of the 1970s. An East African Regional Programme on Occupational Health and Safety was carried out in 1987–1991, funded by the Finnish Ministry for Foreign Affairs. On the request of the three East African countries in 2004, a follow-up programme was planned during 2005–2008, and a 12-month pilot project is currently being implemented, starting 1 September 2008, with the aim to produce a plan for a 4-year regional programme on occupational health and safety by 31 August 2009. The elements of the Programme are

- Development of legislation and OSH management
- Strengthening of service infrastructures, including Basic Occupational Health Services
- Research and surveys, including profiles and indicators (cut flower industry, silica, construction)
- Training and capacity building, and
- Information, communication and networking activities.

The collaborative partners are the East African Community (EAC) and its member countries: Burundi, Kenya, Rwanda, Tanzania, and Uganda. In addition, ILO, WHO and ICOH are involved in the implementation. The Programme document is available on request.

Collaboration in South-East Asia: Vietnam and Thailand

FIOH has also worked together with the Ministry of Health, Thailand and the National Institute of Occupational and Environmental Health and the Ministry of Health of Vietnam in South-East Asia. Earlier, in the mid-1980s, FIOH participated in an ILO project for the establishment of a National Working Environment Institute in Thailand. In that connection, a mobile clinic was donated to this institute from FIOH. The collaboration has continued in the preparation of community profiles and development of Basic Occupational Health Services. For the past 5–6 years, no specific projects have been under way. In October 2008, FIOH and NIOEH in Vietnam signed an agreement on collaboration between the Institutes. There is a plan to donate a mobile clinic to Vietnam for carrying out field surveys and reaching services to remote areas and specific branches of industry, e.g. mining.

Regional Newsletters

The African and Asian-Pacific Newsletters on Occupational Health and Safety were established in 1987 and 1994, respectively. Their aim is to serve as regional information sources and channels of information dissemination to the occupational health and safety experts in the regions. The Newsletters are also available online: www.ttl.fi/AfricanNewsletter and www.ttl.fi/AsianPacificNewsletter. The Newsletters have been published in collaboration with WHO and ILO.

Dissemination of information

International meetings and visits

In order to provide fora for international exchanges of the latest research, to discuss topical issues, and to provide a training platform for FIOH researchers, several international meetings are organized by FIOH.

- May 2007, International Conference on Healthy Air – Better Work - 136 participants, 26 countries
- Jun 2007, NoFS 2007 - Nordic Research Conference on Safety
- Dec 2007, EuroNanOSH – more than 190 participants from over 20 countries.
- Jun 2008, Activity 2008 – over 100 participants
- Planning for the organization of NanoOEH Conference in 2009
- Planning the Nordic NAM meeting in August 2009.
- Three international conferences are being planned for 2010:
- 10th European Seminar on Personal Protective Equipment, scheduled for January 2010
- Towards Better Work and Well-being in February 2010
- International Symposium on Biological Monitoring, scheduled for September 2010
- One in the pipeline deals with organizing an international forum on Basic Occupational Health Services in late 2010–early 2011.

Approximately 210–230 foreign experts visit FIOH annually for short- and longer-term visits.

Collaboration in the neighbouring areas of Finland

Baltic Sea Network on Occupational Health and Safety

The Baltic Sea Network (BSN) has been active since 1995. It is a network of 10 countries' OH&S Institutes around the Baltic Sea. FIOH has acted as the Secretariat from the beginning. The Network currently organizes one annual meeting. Its website is www.balticseaosh.net. During the years, several topics have been discussed in the annual meetings of the Network. This has strengthened the readiness of the Network to work together in various projects. The discussions within the BSN provided a good basis for the Twinning projects of FIOH together with Estonia and Latvia.

Within the BSN, the preparation of country profiles was continued on the basis of previous work, and they are published on the NDPHS web: http://www.ndphs.org/?database,view,paper,22.

Northern Dimension Partnership in Public Health and Social Well-being

In 2005, the BSN was invited to act as an Associate Member of the Northern Dimension Partnership in Public Health and Social Well-being (NDPHS). The NDPHS was established in 2003 and is a Network of Ministries of Health of 13 countries. The Network involves also 9 International Organizations. It has a renewed Declaration from 2006. In early 2007, an opportunity was offered to prepare a Strategy on Health at Work within the NDPHS, to be endorsed by the Partnership Annual Conference (Ministries of Health). The Strategy was prepared, with active input for the contents from FIOH and the BSN, and administratively handled within the Partnership by ILO Office, Moscow (Chair of the NDPHS/OSH Sub-

group). The Strategy 2008–2011 was endorsed on 16 November 2007, http://www.ndphs.org///documents/779/NDPHS_Strategy_on_Health_at_Work.pdf.

In order to implement the Strategy elements, a project proposal was prepared in late 2007, and funding was received from the Finnish Ministry for Foreign Affairs in early 2008. The Programme elements can be implemented in North-West Russia with this funding. The five elements of the Project are:

- Preparation of Regional Occupational Safety and Health Profiles
- Preparation of a National OSH Programme
- Development of Basic Occupational Health Services
- Improving Health and Preventing Accidents in High-risk Sectors, e.g. transport
- Information support.

The members of the BSN have expressed their interest in applying additional funding to implement similar activities in other countries of the NDPHS Region, e.g. the Nordic countries and the Baltic States.

Barents Newsletter on Occupational Health and Safety

The Barents Newsletter on Occupational Health and Safety was established in 1997 by OSH experts from Finland, Sweden, Norway and the Russian Federation to serve as their joint information channel. It has been used for informing of BSN activities, and now recently it is used also for information dissemination of the NDPHS work and FIOH's North-West Russia project in particular. The themes of the Newsletter issues in 2006 were: Occupational hygiene; Young people and work; in 2007: Accident prevention; Infectious diseases, and Musculoskeletal disorders. In 2008, the themes were OSH profiles, Working conditions in transport industry, and Risk assessment.

Nordic collaboration

The Nordic collaboration has a long tradition since the 1950s. It is carried out directly among the Nordic Institutes, within the Board of the Nordic Training Institute, NIVA, and through various collaborative projects funded by the Nordic Council of Ministers.

Organizing the annual Nordic Work Environment Meeting (NAM) rotates among the Nordic countries. In 2008, the request came from the Directors of the Nordic Institutes to analyse the need for and ways of organizing the NAM-meeting, which was organized for the first time in 1951 in connection with the Inauguration of the FIOH main building. It was concluded that the need for the Nordic experts to discuss topical issues once a year exists, but the new forms and collaborative efforts (e.g. with NIVA) in the organization of the event need to be looked into. FIOH organizes, in its turn, the NAM meeting in August 2009.

Long-term collaboration among the Nordic countries continued in the field of psychosocial work environments, through developing validated questionnaire methods and utilizing them in surveys. http://www.norden.org/pub/sk/showpub.asp?pubnr=2000:603 User's guide **http://www.norden.org/pub/sk/showpub.asp?pubnr=2000:012** Validation of the General Nordic Questionnaire (QPSNordic) for Psychological and Social Factors at Work.

The Nordic collaboration in the field of risk assessment of chemicals (NEG) also continues. It is coordinated with the IPCS and other international risk assessment of chemicals activities.

The Scandinavian Journal of Work, Environment and Health is a peer-reviewed scientific journal, published six times a year as a joint venture of the Nordic countries. It is published on a self-financed basis. Editor-in-Chief and Assistant-Editor-in-Chief are FIOH experts.

FIOH is also active in collaboration with the NIVA Training Institute, both in the Board and in organization of advanced training courses covering the entire spectrum of occupational health and safety:

Table 6.1.2 FIOH experts as course leaders within the NIVA training.

2006	1 week	Age Management: Working after 60? – Juhani Ilmarinen
	3 days	Seafarers' Occupational Risks and Health Examinations – Heikki Saarni, Andra Ergle
	4 days	The Evidence-base Approach for Occupational Health Practitioners – Jos Verbeek
	1 week	Work/Life Balance – Challenges and Opportunities – Kaisa Kauppinen
	1 week	Applications of Toxicology in Occupational Health – Jyrki Liesivuori, Tiina Santonen
	1 week	Modern Trends and Needs in Occupational Safety and Health (Russian) – Eero Korhonen
	3 days	Promoting the Health and Safety of Security Workers by Risk Management – Sirpa Lusa
2007	1 week	Health Risk Management of Occupational Exposure to Electromagnetic Fields – Maila Hietanen
	3 days	Workplace Health Promotion – Integrative Workplace Health Management – Timo Leino
	1 day	Good Occupational Indoor Environment – Our Common Goal – Anna-Liisa Pasanen, Raimo Niemelä
	1 week	Bullying and Harassment at Work – Maarit Vartia, Ståle Einarsen, Helge Hoel
	1 week	Safety Research – Jorma Saari
	1 week	Occupational Health and Safety in the Construction Industry (Russian) – Eero Korhonen, Jorma Saari

Table 6.1.3 FIOH experts as course leaders within the NIVA training (continued).

2008	1 week	Age Management: Life Course and Work – Juhani Ilmarinen
	1 week	Safety Research/Week 2 – Jorma Saari
	1 week	Seafarers' Occupational Risks and Health Examinations – Heikki Saarni
	3 days	A workshop on Cardiovascular Disorders and Return to Work – Harri Lindholm
	1 week	Occupational Dermatology – Antti Lauerma, Ann-Therese Karlberg
	1 week	Occupational Exposure Limits – Gunnar Johansson, Tiina Santonen
	3 days	Safety and Risks of Nanotechnologies and Nanoparticles to Workers and Citizens – Kai Savolainen
	4 days	Cleaning and the Work Environment – Leila Hopsu

The Directors of the Nordic Institutes meet once a year, discussing topical issues relevant to the Institutes and the countries.

Future challenges and plans of the international collaboration

FIOH will continue its international collaboration, as working conditions in one country increasingly have an influence on working conditions in other countries. The guidance of the Nordic Welfare Model in the improvement of working conditions and promotion of workers' health can be utilized in other parts of the world. Occupational health and safety is an area where international collaboration is natural. The vast majority of international collaboration is today carried out in various networks and multilateral/multidiagonal projects. This is due to the need for effective use of resources. It poses a challenge – not only to the expertise, but also to the experience, knowledge, as well as organizational, communication and social skills of the experts.

In the globalizing working life, workers' health is equally invaluable everywhere. The working conditions vary widely among the countries, but also among occupations within the countries. Therefore, international collaboration can in many ways be utilized for the development of working conditions in every country. International collaboration is a continuous learning process for all who are involved in it. With good division of labour, the Strategies of the International Organizations can be translated into practical actions at the local and company levels.

Young experts need to be involved and coached for international collaboration. This has been carried out by involving younger experts in various programmes. This needs to be done more in the years to come. Sufficient funding is a prerequisite for the successful implementation of various activities.

Self-evaluation

One of the key issues in international occupational health and safety collaboration is to have well-selected strategic priorities and good networks, both vertically and laterally. Networks may become functional if there is trust among the members. Another important prerequisite is to work in a determined way, committing oneself to the ethical principles and priorities, and being flexible in the practical implementation when needed. A minimum time for seeing any impact in international collaboration is often 10 years. Therefore, it is important to be able to show continuity. In this, FIOH has succeeded, at least to some extent. It would have been possible – with the competence and knowledge available – to achieve more, if more financial resources could have been directed to various activities. This can be improved in the future.

The WHO and ILO collaboration has been carried out as extensively as has been possible with the resources available.

The collaboration in East Africa has proceeded smoothly to a 12-month planning phase, funded by the Ministry for Foreign Affairs. The five East African partner countries are eager to launch a longer-term programme. This self-commitment of the partner countries is a prerequisite for the Finnish Ministry for Foreign Affairs to fund the activities.

The collaboration in the neighbouring areas of Finland covers the endorsed Strategy on Health at Work and a subsequent Framework Project that has been started in North-West Russia. The penetration of the Barents Newsletter for information support can be seen. It takes about seven years to get the new information channel well-established. The impact of the North-West Russia project, which continues the collaboration of previous collaborative projects in the Republic of Karelia, remains to be seen.

6.2 EU Collaboration

Strategic goals and objectives set for EU collaboration

In addition to general strategic goals of the strategy for international affairs, FIOH's objective in EU collaboration is to be a renowned active specialist institute and collaborator in its field. In this role FIOH:

- strives to influence system-level development and EU policy-making in occupational health and safety; the development of occupational safety regulations, norms and standards; and the introduction of good practices at workplaces. As many OH&S decisions are actually made on the European level, this activity fulfils FIOH's ultimate goal of improving workers' health at Finnish workplaces.
- implements R&D projects in collaboration with other European institutes, and develops partnerships and networks in order to find good scientific collaboration and to increase its own scientific knowledge and standards
- strives to increase its own influence and impact in European research collaboration and networks
- develops clientships in the EU (chargeable advisory services)

FIOH also aims to increase its EU collaboration and EU funding.

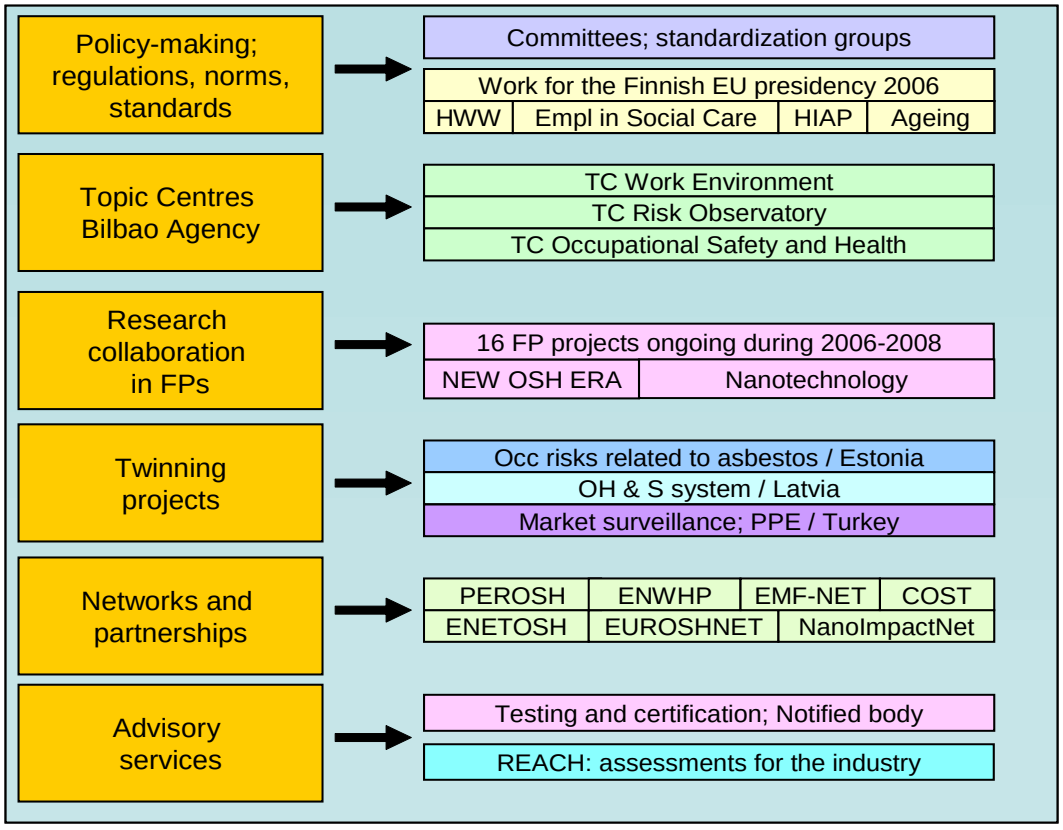


Figure 6.2.1 The EU collaboration of FIOH in 2006–2008.

Organization, resources (person years)

EU collaboration is led by the Director General. The progress in various activities is reported to the Executive Committee once a year.

The Centres of Expertise execute individual EU projects. There are about 30–35 simultaneously ongoing projects, and about 10–15 new EU projects of different sizes are launched annually. The length of a project is typically 3–5 years.

The Centre of Expertise for Internal Services provides administrative support for EU projects, for example information on open calls, support in finding funding and making applications, signing contracts, writing financial reports, etc. From the beginning of 2009, the Project Office of the Internal Services has been in charge of providing this support.

Table 6.2.1 Volume and resources in EU collaboration.

	2005	**2006**	**2007**	**2008**
EU and ESR research funding	0,75 MEUR	0,83 MEUR	1,18 MEUR	1,23 MEUR
Percentage from external research funding	11,1 %	11,8 %	14,9 %	14,6 %
Working time (in weeks) of *all* EU projects(not national ESF projects)	693 (15,7 person years)	1 032 (23,4 person years)	1012 (23 person years)	916 (21 person years)
Working time (in weeks) of national ESF projects	not available	760 (17,3 person years)	672 (15,3 person years)	91 (2,1 person years)

An internal network of experts and researchers, who are either active in EU collaboration or willing to learn about it, meets four times per year. A network of supporting staff who handle the administrative and financial matters of EU applications and projects meets occasionally to disseminate information and to enhance the competence and skills needed in EU collaboration.

Main outputs 2006–2008

Participation in policy-making and system-level development of regulations, norms and standards

FIOH is a member of several EU-level committees and preparatory groups, in which it sometimes represents Finland and sometimes takes the role of an invited expert.

In 2008, FIOH experts participated in 15 committees and working groups (12 committees in 2007), such as the national coordination group of the Bilbao Agency, the Scientific Committee for Occupational Exposure Limits (SCOEL), the New Working Environment Advisory Group, the Scientific Committee on Emerging and Newly Identified Health Risks; 15 European networks (year 2007: 15), and 65 standardization groups (year 2007: 78), particularly in PPE and ergonomics. The detailed lists are available on request.

Work for the Finnish EU presidency 2006

The Health in the World of Work - Prolonging Healthy Working Years (HWW) project

FIOH coordinated an international project preparing an expert recommendation, which was discussed at the informal meeting of the Ministers of Employment, Social Affairs and Health. Central Finnish stakeholders contributed to the preparation of the recommendation; MSAH, the Ministry of Labour, Central Organization of Finnish Trade Unions (SAK), Confederation of Finnish Industries (EK) and National Public Health Institute. The project's European partner was the European Network for Workplace Health Promotion. It was funded by the EU Public Health Programme, MSAH, and the Finnish Work Environment Fund. A detailed

description of the project is in the *Participation in working life and employment development*, special report page 7.

The future for employment in social care in Europe Conference

The conference was an initiative of the European Foundation for the Improvement of Living and Working Conditions, and was organized together with STAKES. The seminar took place on 2–3.10.2006 in Helsinki and had 80 participants. The conference report can be found on the Eurofound website: http://www.eurofound.europa.eu/publications/htmlfiles/ef0701.htm

Expert Meeting on Health in All Policies (HIAP)

The meeting was organized by MSAH and STAKES. FIOH participated in the planning committee, prepared background material and contributed to the writing of the Health in All Policies publication.

The Towards a longer worklife! Ageing and the quality of worklife in the European Union by Juhani Ilmarinen Publication; FIOH

This book was published as background material for the EU presidency in Finnish and in English, and was distributed in meetings and other occasions during the term.

Topic Centre activity with the Bilbao Agency

FIOH has participated in the Topic Centre (TC) activity of the European Agency for Safety and Health at Work (Bilbao Agency) since its beginning. In this activity, FIOH contributes to the work of the Bilbao Agency Finnish focal point, the Department of Occupational Safety of the Ministry of Social Affairs and Health.

TC Work Environment (TC WE) and TC Risk Observatory (TC RO)

FIOH coordinated the TC WE and was a partner of the TC RO from 2004 to 2009. The basic task of the Topic Centres is to collect, evaluate and analyse information on important aspects of work and health protection on both an international and European level.

TC WE had 13 partners and 4 subcontractors. The work has consisted of:

TC RO was co-ordinated by INRS, France. There were seven partners in the consortium. The general object was to describe the development trends and risk factors in European OHS and anticipate changes at work and their health impacts. During recent years, information has been collected, analysed and disseminated, for example in the form of fact sheets.

The work of the TCs has consisted of (among others):

- preparing material for the Bilbao Agency campaign on maintenance work
- updating and developing the Agency's web-pages
- collecting material on economic incentives for improving OHS
- branch studies: transportation, cleaners, hotel and restaurant branch
- taking part in preparations for the 2008 European Week: Cutting down workplace accidents and diseases, and the 2007 European Week: Lighten the load, musculoskeletal disorders

- ageing workers
- exposure to carcinogens
- exposure to UV-radiation in various branches; modes of protection
- psychosocial factors
- bullying and violence at work.

TC Occupational Safety and Health

At the end of 2008, FIOH began to co-ordinate the large Topic Centre Occupational Safety and Health (TC-OSH) with a consortium of 20 European institutions. This is already the fourth time FIOH has been trusted with the responsibility to coordinate TC.

Acknowledgements of the Bilbao Agency

FIOH received a European Good Practice Award in 2006 provided by the European Agency for Safety and Health at Work. The Award winner project was entitled "Passport to health and safety skills: resources and competition". FIOH's project "Participative development of work methods (Satke, Taske)" was also acknowledged as "commended entries" by the Bilbao Agency in the European competition in 2007.

Participation in Framework Programmes (FP) for Research

Research collaboration with European research institutions is carried out when the topics match FIOH's strategic goals and when their implementation is supported by the work at the EU level.

In the sixth FP, occupational health and safety was not a clear priority. Despite this, FIOH received some funding for its projects from various sub-programmes of the sixth FP. The seventh FP, launched at the beginning of 2007, offers better opportunities for participation than its predecessor.

The biggest ongoing EU projects are the FP projects NANOSH, NEW OSH ERA and NANODEVICE.

Table 6.2.2 Participation in EU Framework Programmes.

	5. Framework Programme 1998–2002	**6. Framework Programme 2002–2006**	**7. Framework Programme (12/2006-**
Total applications	70	38	22
Accepted applications	19	10	8 (*
Coordinations of accepted applications	4	2	2
Rejected applications	51	28	14

*) *) three projects in the contract negotiation phase

The European Social Fund (ESF) offers FIOH an important channel for implementing its national objectives. Until now, FIOH has annually had about ten ongoing ESF projects, but due to the end of the earlier programme term, and the delay of the new programme term in

Finland (2007–2013), at the moment there is three ongoing and four in the contract negotiation phase.

New OSH ERA (6. FP)

FIOH is the coordinator of the extensive ERA-NET New OSH ERA project. It aims at forming a European research area in the field of new and emerging risks at workplaces through the rationalizing and pooling of resources. The New OSH ERA consortium includes 21 major public agencies, ministries and research organizations from ten European countries.

The general target of the ERA-NET instrument is to create mechanisms to make national research funding internationally accessible. There are only a few national funders in OSH in Europe, and the total amount of funding is very small. The New OSH ERA aims to prioritize the fields of common research interests and areas within OSH in Europe, and to organize a common call for them. Reaching a consensus between the countries is not an easy task because they have different national priorities. At this point, two areas of common interest have been identified: psychosocial factors at work and nanotechnology.

Research on nanoparticles: NANOSH (6. FP), NanoImpactNet(7. FP) and NANODEVICE (7. FP)

FIOH is actively involved in the highly topical research on safety of nanotechnology. It co-ordinates projects concerning occupational exposure to nanoparticles in both the Sixth and Seventh FP (NANOSH and NANODEVICE), and is a partner in two projects (the other one in the contract negotiation phase).

Twinning projects

Collaboration with new Member States and accession countries through Twinning projects has been an important form of FIOH's EU collaboration since the beginning of the 2000s. Twinning Programmes fund large scale development projects between administrations, and strive for long-lasting infrastructural changes in the target country.

FIOH coordinated three successive projects in Estonia, was a partner in one project in Latvia and one in Turkey. Since the Baltic countries are no longer eligible to receive Twinning funding, this kind of collaboration has slowly come to an end. For the meantime, FIOH has decided not to make any further tenders for Twinning coordinations, as these projects are time- and resource-consuming, even though educational for experts.

Twinning projects 2006–2008:

- Managing Occupational Risks Related to Asbestos, Estonia 9/2006–2/2008
- Occupational Health and Safety System (Further Development); Strengthening of the current Institute of Occupational and Environmental Health, Latvia 2006–2007
- Strengthening the capacity of Turkish ministries for Market Surveillance in selected areas; Component 3: Market Surveillance support on Personal Protective Equipment; Turkey 2005–2006.

Partnerships and networks

FIOH can enhance the level of its own scientific performance and competence through collaborating with other European institutions in R&D projects, and participating in calls for competed funding.

PEROSH collaboration

Since the establishment of PEROSH (Partnership for European Research in Occupational Safety and Health) in 2003, FIOH has been an active member. PEROSH consists of 15 major European institutes.

Currently, FIOH is a partner in four PEROSH projects and coordinator in two projects: *Clearing-house systematic reviews on occupational health and safety topics,* and *Safety culture and accidents: Promotion of zero accidents vision*.

Other EU networks

These are, for example:

- EMF-NET, Effect of exposure to electromagnetic fields
- ENWHP, European Network for Workplace Health Promotion
- ENETOSH, European Network for Education and Training in OSH
- EUROSHNET, the European network for occupational safety and health experts involved in standardization, testing/certification and/or related research
- NanoImpactNet, European network on the health and environmental impact of nanomaterials
- COST Networks

A detailed list of networks is available upon request.

Specialist advisory services and development of clientships

FIOH's international specialist advisory services include testing and certification services as a Notified Body.

According to the implementation of the REACH legislation, FIOH provides chemical safety assessments for the industry. In these extensive service projects, the clients are international industrial umbrella organizations and enterprise consortia formed by industry. Related to REACH issues, FIOH has organized several national and one international training course, and disseminated a great deal of information. In addition, FIOH is leading a consortium which has made a framework contract with the European Chemicals Agency, regarding expert services under REACH.

Future challenges and plans

The skills and competence for EU collaboration seem to cumulate to a few FIOH experts. It would be important to distribute the EU competence to a wider group of experts. EU funding is important for FIOH's financial research resources, and the competition to get it is hard.

Experts should be encouraged to write proposals and take more coordinations even if it is time consuming. Experience in EU coordinations would, however, be important to gain, because the coordinator always has the biggest influence on the entire project.

Self-evaluation of the EU collaboration

Through TC activity, FIOH can gain influence in EU and European countries, because geographical coverage is a prerequisite for these projects, and all participating institutions are major institutes of their own countries.

The Twinning projects of FIOH have improved the OH&S infrastructure in cooperation countries (Estonia, Latvia, Turkey) regarding adjusting and implementing the EU legislation. Taking into account the effort put into these projects, the results have not always been so sustainable due to, for instance, drastic political changes in the target countries.

In policy making and system-level development, we promote Finnish viewpoints in the European Union and ensure that the special features of Finnish working life are taken into account when, for instance, harmonizing EU legislation. Furthermore, participation in preparation work is an effective way to implement the new research knowledge produced by FIOH regarding product safety and usability, ergonomics, and workers' safety.

Having impact at research policy level and gaining visibility on the European agenda are important achievements of the New OSH ERA project. The Ministry of Social Affairs and Health and the Finnish Work Environment Fund are partners in the project, are able to contribute to policy linings and have immediate access to all results.

The interest at EU level in nanoparticles is well in line with FIOH's strategic goals. FIOH is on the front line of European research in this new field, and many scientific publications will be published from 2009 onwards. These projects produce new important information on the occupational health effects of nanotechnology for the European Commission and through that to European countries.

The Ministry of Social Affairs and Health has evaluated FIOH's EU collaboration in 2007 as follows:

- Implementation of age management has been promoted in Finland and EU
- The applying and receiving of EU funding has been active in projects, which have supported the strategic goals of the MSAH
- Research and information dissemination in the field of nanosafety has been very valuable and it promotes the improvement of safety in domestic and EU level
- FIOH has assisted the national coordination of Bilbao Agency Network (which has the national focal point in MSAH) and implementation of its tasks.
- Evaluation of reaching the goals set in general (1–5): 4.

FIOH's self-evaluation of EU collaboration follows the one of the MSAH: good ++

7 Regional Activities

In the new organizational structure, the Regional institutes have been replaced by the Regional offices. The Regional offices are located in Helsinki, Kuopio, Lappeenranta, Oulu, Tampere and Turku (Figure 7.1.). Each regional office has a regional director as a representative of FIOH management. The personnel working in the regions belong to teams or to thematic areas of six Centres of Expertise (Table 7.1.). The team or thematic area leaders can be situated in different Regional office than the team members. The members of teams in the Regional offices offer FIOH's services to area companies and organizations. There are also research and development -oriented team members in the regions. The members of thematic areas in the regions work for developing new innovative products. The team of Internal services support the client work of experts and offer infrastructure area the needed services. The main environmental oriented tasks of the regional directors are

- to follow up and analyse the working life changes in the environment
- to create and develop client, interest group and partnership connections and cooperation
- to coordinate multidisciplinary and multi professional service operations
- to coordinate branch and industrial sector work

The regional director has an internal coordination group in the Regional office to manage the internal and environmental work. Each regional office has a Regional Advisory Committee with 18 members and 18 vice members representing universities, labour market organizations, authorities, regional councils and influential enterprises. The committees are to activate collaboration and to focus the activities on issues of regional importance.

Figure 7.1 The Regional Offices of FIOH.

Table 7.1. Staff statistics at the end of 2008

Number of	**Helsinki**	**Turku**	**Tampere**	**L-ranta**	**Kuopio**	**Oulu**
Personnel	30	48	68	22	72	59
Teams	6	14	24	10	18	22
Team leaders	3	3	3	1	6	1
Education (PhD/MSc/other)	6/14/10	15/23/10	14/32/22	1/13/8	14/41/17	10/28/21

Availability and quality of occupational health and safety services in the regions

One of the basic tasks of the regional offices is to offer expert services to workplaces. In the institutes, about 80 people work full-time in workplace expert services. The distribution of those workers is showed in table 7.2.

In the work environment sector, there are about 60 experts offering services to workplaces as their main work. In 2008, those experts conducted about one thousand occupational hygiene surveys, including measurements and advice to control hazards. Surveys have been extended quite widely all over the country. The geographical distribution of those reports has been collected on table 7.2. In 2008, about 370 workplace assessments were made related to chemical agents, 200 to physical agents, 400 to indoor climate and 20 to ventilation. Besides occupational hygiene services in the workplaces regional offices also make analyses in chemical laboratories. The laboratories are situated in Helsinki, Tampere and Turku. Each laboratory is specialized in different chemical agents and analyses.

In work community services, there are about 20 experts in FIOH who made altogether 12 working years in services in 2008. In Helsinki, FIOH has seven professionals, in Turku and Tampere three, in Oulu two and in Kuopio and Lappeenranta one. In 2008, altogether 120 work community development projects or consultations were carried out in workplaces as FIOH expert services. Sixty-four of the projects were conducted in the Helsinki region and 56 elsewhere in the country (Table 7.2.). Also, training services were given to workplaces concerning work community, in total about 600 training hours, 146 in the Helsinki region and 456 in other regions of Finland. The support is given to develop organizations, to carry out questionnaires, to help to resolve conflicts or crises, to give lectures in the workplaces and to counsel managers or other professionals. Some courses of organizational development were arranged every year.

FIOH also organized training in occupational health and safety throughout Finland from every regional office. In 2008, a little more than half of the courses and about half of trainee days were organized out of the Helsinki metropolitan area. The geographical distribution of training courses and trainee days has been showed in table 7.2. In 2008, FIOH reached 8 500 experts of occupational health and safety or workplace occupational safety representatives through those courses.

FIOH also has an outpatient clinic for occupational medicine in all regions in cooperation with central hospitals. This cooperation covers all (five) university hospitals and five other central hospitals. In these five regional clinics, altogether about 1 000 patients are examined annually. It is equal to the amount of patients that FIOH annually has in the Helsinki main clinic. Different kinds of work related diseases, especially occupational diseases, are examined; mainly occupational asthma, asbestos related diseases, vibration-induced disorders and solvent-induced disorders. A special occupational medicine team in the Tampere regional unit is focusing on diagnosis of occupational diseases. One of the projects was the incidence of occupational hand vibration in the Tampere region. It was confirmed that hand-arm vibration syndrome was under-diagnosed. Similar projects concerning the incidence of silicosis are now ongoing.

Table 7.2 Regional distribution of workplace expert services and training activities in 2008. As well the personnel whose main work are services, excluding laboratory staff.

Region	Occupational hygiene expert services		Work community expert services		Training
	personnel	reports	personnel	projects	courses/ trainee days
Helsinki	19	270	8	64	129/9644
Kuopio	7	105	1		17/1170
Lappeenranta	8	145	1		25/693
Oulu	6	150	2	56	17/1330
Tampere	12	260	3	(altogether)	78/5840
Turku	9	180	3		21/820

FIOH has been invited with increased activity to contribute to client oriented well-being programmes. For example, a well-being survey and development programme was carried out in a global shipyard enterprise in Turku, where multidisciplinary and multi-professional cooperation between various Centres of Expertise teams and themes were utilized.

There are some high knowledge-based countrywide activities run by regional offices, for example occupational safety training (Tampere), development of farmers occupational health (Kuopio), hazardous emission for machines (Lappeenranta), special research activities for occupational diseases (Tampere), research activity in cold climate (Oulu), entrepreneurs' occupational health care (Turku), and laboratory for acoustic and thermal environment - product development, workspace modelling and perception (Turku).

Contributions to regional development programs - New perspective of FIOH activities in the period 2006–2010

Each Regional office has collected information of the well-being situation in their region.

During this strategic period, FIOH has contributed with increased activity to the regional development programs managed by regional councils. This supports the common effort of FIOH to join and to be a more active actor in the regional and countrywide network and to get common issues of work environment and occupational health and safety into the regional programmes and strategies.

There have been two types of contribution into the regional development programmes:

1. Activity in strategies and health policies of regional councils. The Regional Councils (altogether 20 regions and provinces in Finland) are regional, politically guided, municipal coalitions for the development and interest supervision in the county.
2. Activity in regional development programmes in improving working conditions, funded mainly by the European Regional Development Fund (ERDF) and the European Social Fund (ESF)

An example of activity of type 1) has been the building of innovation strategy for the Uusimaa regional council (2006) in which occupational health aspects were taken into account proposed by FIOH representatives. In the chapter of social innovations, actions alike aims of FIOH were proposed: to create in cooperation with OHS and SME new entrepreneurship models and practices to improve OHS services for SMEs and to use multicultural immigration as a potential in improving working life and conditions. The second example is the contribution in the Health Policy of the Council of Oulu and Lapland Region, where OHS and work environment aspects were stressed as well.

An example of activity in type 2) has been (2008) a project to improve work risk and safety in the bioenergy branch funded by ERDF programme for East Finland. FIOH Kuopio regional office participated in the project led and coordinated by Kuopio University. FIOH Oulu is taking part in a learning network project with Oulu University as part of the Employment and Economic Development Office (Tykes). The Learning network (TYHJÖ) was created to increase the developmental expertise of the participants, to create and experiment with new forms of development between R&D units and workplaces and also to generate new, innovative solutions for Finnish working life. Two ESF funded projects, one in Turku and one in Kuopio, have been conducted on entrepreneurs' working conditions and health with an impact on the whole country.

Partnership agreements with universities

Each regional office has one or more universities in its area. FIOH has Partnership agreements with the Universities of Jyväskylä, Kuopio and Turku. An agreement with the University of Helsinki is made with the Department of Public Health. There are eleven joint professorships between FIOH and universities. Joint professorships cover occupational health (Helsinki, Kuopio, Turku and Tampere), work and thermo physiology (Oulu), physical medicine and rehabilitation (Oulu) and psychology (Helsinki and Jyväskylä), toxicology (Turku), epidemiology (Turku) and aerosol physics and nanotechnology (Helsinki). Cooperation with the universities is focused on teaching, guidance for theses and research and development. FIOH researchers have supervised more than 50 M.Sc. theses and 10 Ph.D. theses of students who have later been employed by FIOH. In addition to the joint professorships, there are 56 adjunct professors from FIOH staff working part-time in ten universities and in 16 disciplines. In Turku, FIOH is an active partner in the university consortium for multidisciplinary labour studies (Turku Centre for Labour Studies).

Future collaborations with university departments are becoming more important as they will provide a possibility to

- keep FIOH researchers' scientific knowledge updated and exposed to potential innovations for further application in FIOH activities
- set up projects and apply financial support for research of mutual interest
- supervise Masters and PhD theses with multidisciplinary approaches widely in the field of occupational health and safety.

Collaboration and network

The partner network has been created to secure the updated information in and out from FIOH. The research and development work and the implementation of new products and good practises have been conducted in close collaboration with partners and clients, such as:

- Organizations of different industrial and service sectors
  - Organizations of employers and employees
- Research network
  - Universities and institutions of higher education
  - Research institutes
  - Universities of applied sciences
  - Other educational institutes
  - Centres of education
- Public sector
  - Regional councils
  - Municipalities and centres of expertise
  - District municipalities and centres
  - University and central hospitals
  - Hospital districts
  - Centres of technology
- Private and third Sector
  - Enterprises
  - Private research centres
  - Private services
- Trade union organizations

The main mediating bodies and dissemination channels for good occupational health and safety practices are occupational health care units and occupational safety and health inspectorates. Occupational health care units, with their clients, have formed the platform for development and dissemination pilots. Topics of European safety week campaigns "Building safety" (2004), "Stop that noise" (2005), "Young people" (2006), "Lighten the Load, Musculoskeletal disorders" (2007) and "Risk Assessment" (2008) have formed the base for collaboration with occupational safety and health inspectorates. Other joint regional events have been training courses on health effects and control of wood dust and research on the risk assessment activities at workplaces.

Collaboration with regional polytechnics is focused on training and applied research. Typical contributed topics of regional offices have been occupational health and safety, industrial hygiene and healthy work communities.

Regional offices have acted in close cooperation with the university hospitals and central hospitals to analyse and to develop diagnosis of occupational and work-related diseases. The regional offices have provided the expertise in occupational medicine and working conditions needed for the diagnoses, and have offered counselling for occupational health professionals in the identification of work-related diseases and work capacity.

Regional offices and personnel have supported many national events organized in the regions, e.g.:

- Good occupational health service practises

- EU's new chemical legislation REACH-info for workplaces and occupational health care units
- Up-to-date information on indoor environment problems
- EU's safety week events
- Zero Accident Forum events
- New research results about the health effects and control of wood dust
- Content of occupational health examination of traffic drivers.

Regional offices have increased the amount of invited regional occupational health care personnel to follow-by-video events organized by FIOH in Helsinki, e.g.:

- Friday meetings of occupational medicine
- Studia General type lectures
- Well-being seminars
- Working life seminars
- FIOH's research day

Branches and industrial sectors

Regional offices have specialized in following branches and industrial sectors: Kuopio in agriculture, forestry, biotechnology and waste sectors; Lappeenranta in forest industries, transport and logistics; Oulu in security and safety branch and industry of technology (for example metallurgy and mining); Tampere in construction and food industries; Turku in municipal sector, health care and social services; and Helsinki in trading and service sectors, chemical industry, rubber and plastic industries. Those branches and industry sectors, which have had their own teams e.g. transport and logistics, health care and social services, have had better resources and organized actions such as longitudinal surveys, guidebooks concerning good practices for occupational health care and hazardous control. The work for branches and industrial sectors offers a possibility to be client-oriented. The client-oriented problems of branches and industrial sectors provide a multidisciplinary approach thus increasing cooperation between various teams.

In industrial sector work, the main cooperation parties are federations of industries and employers and employees, as well as Occupational Safety Committees at the Centre for Occupational Safety. Focused activities within industrial sectors have been in gathering health and safety indicator data, training of occupational health and safety, as well as conducting research projects.

Some examples of research and development activities in branches and industrial sectors where regional personnel have participated:

- Agriculture: 1) Good occupational health service practises, 2) Work and well-being on farms
- Chemical, rubber and plastic industries: Consequences of Reach-legislation
- Construction: 1) Well-being of machine entrepreneurs, 2) East work ability (Itä-Tyky)
- Food industries: 1) Workplace examination as apart of well-being programmes, 2) Good practises in food production
- Forest industries: 1) Wood dust exposure in EU, 2) Development of occupational well-being and management of sickness absence in the Finnish paper industry
- Forestry and biotechnology: Health risks and safety in the production and use of biofuels

- Health care and social services: 1) Development of work with ageing people, 2) Promotion of work safety in hospitals
- Municipal sector: 1) Municipality-10 (Kunta-10) surveys, 2) Turku Centre of Labour Studies (Turku)
- Security and safety branch: 1) Work in cold climates, 2) Occupational health and safety of rescue personnel
- Technology industry (metallurgy and mining): 1) Safety in mining, 2) Exposure to metals in foundries
- Trading and service sectors: Work conditions and health in the service sector
- Transport and logistics: Safety and health of professional drivers
- Waste sector: 1) Health risks, 2) Chemical hazards in recycling electric and electronic waste

Collaboration with neighbouring regions

Collaboration with neighbouring regions in Russia has focused on control and education of health risks in mining at St Petersburg and Kirovsk. In the Interreg III A project in the Carelian Republic (RUS), health and safety indicators were compared with indicators used in Finland, and risk assessments were carried out in paper machine and pellet production in the Carelian Republic.

In collaboration with Nordic countries, a joint Work Life Development seminar has been arranged once a year. The main partner is Högskolan Dalarna in Sweden. The main topics of collaboration have been the attractiveness of work and the workplace, visualization of exposure and modelling of human at work. The Swedish questionnaire on attractiveness has been translated and applied at workplaces in Finland.

Future challenges and plans from FIOH: the regional view

View to service personnel in FIOH

Many experts will retire in the coming years, and there is a great task to transfer silent knowledge to co-workers and the work community. Working pairs are used when at least two team representatives are in the regions. It is recommended that human resources are situated in the regions so that work can be performed in pairs. Multi-professional skills help to provide fast responses to clients' multi-professional demands, and continuous professional training is needed to enlarge the expertise of service personnel.

View to service development needs

Clients are more interested in health promotion approaches which provide multi-professional and multidisciplinary cooperation between FIOH's teams and themes, but also networking with other partners.

Further efforts are needed to change the focus from preventive work to pro-active actions. Participation in the design phase of workplaces, factories, offices, machines, tools and materials will help take into account the human factors in the early stage. Early stage actions, dissemination of knowledge, training and directions, are needed in planning and construction

sectors to avoid indoor air problems. Further efforts are also needed to extend exposure assessment services towards measures to control hazards.

New risk assessment measures are needed for new technology and new hazards e.g. applications of nanotechnology at workplaces.

Subcontracting is still increasing, causing difficulties to occupational health and safety aspects and management chain making new management and audit tools development necessary.

View to regional well-being needs

Chances in work life are not just local appearance its global phenomenon which means that FIOH has to be prepared to them locally and the influence for reacting has to see in globally. Key words in understanding the changes taking place in the world include globalisation, technology, population, energy and the environment. Most all of the choices made are increasingly affected by three factors: the challenges and opportunities arising from people and well-being, the opportunities created by technology and economy and restrictions, challenges and opportunities related to the environment. People with their human potential and choices are at the core. Individuals who feel well are creative and innovative and able to utilise diverse information sources and division of tasks as well as various partnerships and networks in both their work and leisure time.

Regional activity means FIOH is near the workplaces, and FIOH is supporting them to abide all the changes. Regional offices are in the middle of the changes, and they have their mission from FIOH: a whole organization promotes health and safety at work and the well-being of workers in the whole country. From the view of FIOH, this means that its organization representatives who understand the local differences and also know the local partners can very quickly react and offer FIOH's solutions for their clients.

There is a need to involve well-being and multicultural work community issues into a part of the regional well-being programmes.

Global enterprises are organizing all well-being activities, including occupational health and safety, under one umbrella in order to strengthen the management's possibilities to follow the inputs and outputs. FIOH has replied to the demand by creating a service package with analysis of the current activities, evaluation of OH services, training of the staff and managers and improvement of OH and safety measures. The well-being package is a product with a programme for financial follow-up. It is anticipated that future enterprises are expecting even more tailored and scientifically more demanding services.

There are ongoing regional development programmes in which larger centres are formed from separate units. The new centres need support to form the new work communities and to promote well-being there.

Small enterprises have a lack of their own resources. They need programmes from outside to help them put well-being activities into practise.

The demand of support for work communities are expected to increase. The world-wide economical recession has meant downsizing the production and workforce and cutting costs. Workers who have lost their work need support in seeking new work and for re-education. Depression, as a reason for early retirement, has increased especially among the unemployed but also among the employed. The demands of work have been increased and continuous

promotion of human resources is of high importance. Workers and communities who have managed to continue need support to promote well-being in times of change.

On the other hand, there are branches which have a lack of workers. Such branches need activities to improve the attractiveness of the work and to develop working arrangements and work loads.

FIOH regional offices will be in a special role

In addition to global enterprises and companies doing well in their business, there will always be small enterprises, some with entrepreneurs themselves as the only worker providing daily services to local people. With special funding, FIOH should be supporting entrepreneurs and small companies to manage, survive and obtain occupational health and safety, as well as other well-being needs, as these people in turn need services provided by the municipalities; helping to keep the well-being circle rolling.

Self-evaluation

(Moderate +, Good ++, Excellent +++)

As a response to the recommendations from the 1997–2003 evaluation, FIOH changed the status and the organization in the Regional Institutes.

Results in regional development: +

Regional offices' contribution to regional development programmes, prepared and managed by regional councils, has been successful in Oulu and the Helsinki regions, where well-being aspects from the occupational health and safety point of view have been included in the programmes. In other regions, channels have also been opened.

Results in making FIOH's services available regionally: ++

The current strategy is based on the extension of all services and application of research results throughout the entire country. For this task, the structure of the Finnish Institute of Occupational Health is well planned in locating the experts from different fields and services in the country. There is some variation in the team coverage in the regions, and therefore, all services are uniformly available throughout the country. If the team has no representative in the region, services have been offered by the experts of the nearest region. Because of limited human resources and great demand, mainly of indoor air quality services, work community counselling and in training of work safety expert, the delivery times have been increased.

Use of partnerships, mediating bodies and other distribution channels in disseminating outputs to clients: ++

The Regional offices have been active in seeking partnerships with universities and in disseminating outputs to occupational health care personnel and occupational safety and health inspectorates**.** Lectures, events and media contacts have been used in spreading information and knowledge about new tools and forms of action.

FIOH's ability to identify client needs: ++

More than 1 000 contacts in expert services and more than 10 000 participants in training courses per year make it possible to listen to the voice of the client. In service work and in training, the connections with clients are close and feedback from clients is direct and can be taken into account during the process and, at the latest, in the next delivery. Client needs are surveyed with national questionnaires and in some special areas regionally by teams. Clients are satisfied with the quality of services; only shorter delivery times are expected in some cases. Having many long-lasting client relationships best describes the capability to produce services fulfilling client demands.

8 Processes and technologies

8.1. Processes

FIOH's operational efficiency is in the first place based on mastering the best knowledge and best practises, as well knowing how to apply them in specific contexts. FIOH is not a process organization, nor is its productivity based on repeated and standardized actions according to process specifications.

The line (vertical) organization, the Centres of Expertise and units under them, is responsible for the operative management of human and financial resources. The management activities are guided by a set of rules and regulations. The Director General empowers directors and team leaders by defining their mandates in the Ordinance (johtosääntö) of FIOH.

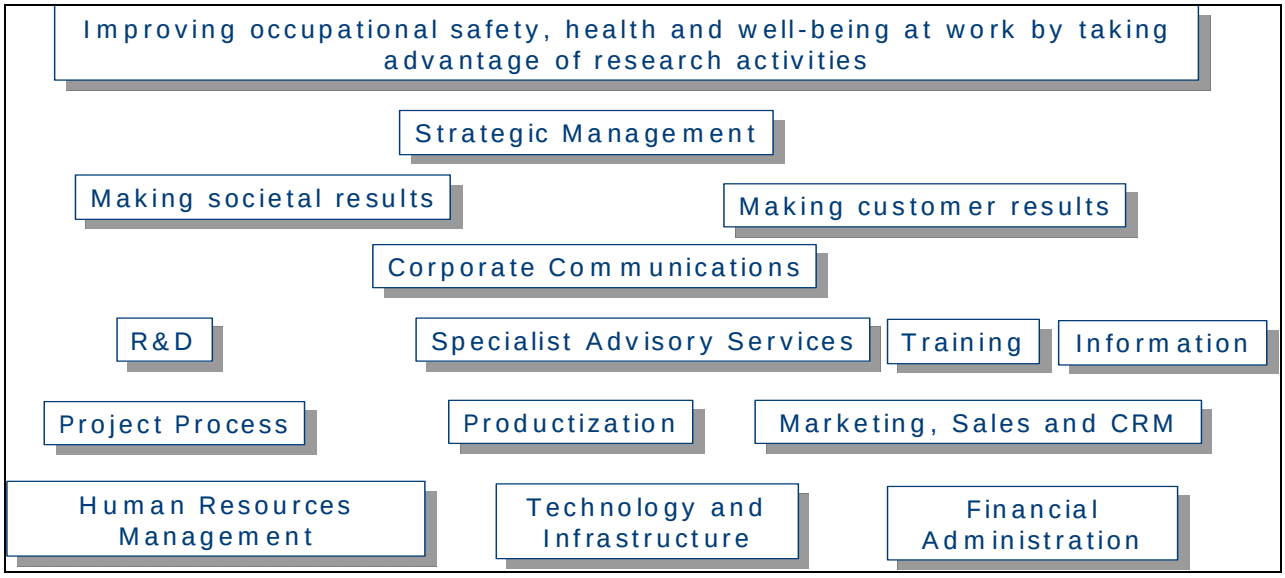
The customer need orientation means context-specific use of knowledge and practises. Therefore, cooperation that exceeds the organizational units is necessary. The contextuality and the intrinsic characteristics of R&D and expertise work bring a lot of uniqueness into each case of operation. In FIOH, the processes are mainly used as management practices that facilitate horizontal cooperation and resource allocation.

FIOH maintains a quality handbook (the FIOH Quality Manual) that gives the general guidelines of the quality management within FIOH. The quality of several service products is assured by an accredited process. This is especially true for the occupational hygiene services where measurements and laboratory analyses are involved. The process accreditations comprise tens of analyses, given and audited by FINAS, the Finnish Accreditation Services. In addition to that, FIOH serves as a notified body for personal protective equipments (PPE Directive 89/686/EEC). Otherwise, ISO quality control is typically applied when there is a process-like production of a service.

The new strategy and the change in the organizational structure in 2005—2006 brought in the need and necessity of several internal development projects. Project management, productization and its governance are examples of development areas. Yet the acquisition of an ERP application (called JOTI) has been one of the largest internal development projects in FIOH. JOTI includes tools for HR, finances, project management, sales and CRM. Therefore, implementation of the JOTI ERP system has implications to almost all happenings within FIOH. The aims of JOTI are to achieve an integrated resource, cost and earnings management that supports strategic steering of the activities and resource use. JOTI is also planned to

produce transparent and reliable reports of the use of funding for the wide spectrum of financiers and modes of financing and thereby strengthen FIOH's competitiveness when applying for external funding. The initiation of JOTI was in January 2009.

Figure 8.1.1 Process map of FIOH's activities.



Improving occupational safety, health and well-being at work by taking advantage of research activities is FIOH's core mode of operation, as discussed in chapters 1 and 2 and elsewhere in this base report (see ch. 1, fig. 1.1). FIOH also characterizes this mode of operation as an innovation model. The innovation model claims that FIOH should bring together customer perspective and the best R&D competence in order to achieve solutions that both meet the needs of customers and are efficiently applicable for the customers.

Strategic management is the responsibility of the Executive Committee of FIOH. The Executive committee is lead by the Director General, and the other members are the directors of the Centres of Expertise and two expert members (head of communications and head of development). The members of the Executive Committee are expected to function as strategic leaders, not as representatives of their respective units. Each of the strategic goals are assigned as a responsibility of one member in the Committee, as well as leading the core functions R&D, Specialist Advisory Services, Training and Information. The director of the Centre of Expertise for Internal Services leads the financing, HR and infrastructure functions. Each of these strategic dimensions is monitored regularly according to an annual time schedule. While the meetings (twice a month) of the committee are more for strategic follow-up and decision making, the committee also holds a seminar once a month to enable in-depth reflecting and opinion forming.

The preparation of the annual activity plans and the annual activity reports is also the task of the Executive Committee. The FIOH activity planning and reporting has to be adapted with the performance management of the Ministry for Social Affairs and Health. The performance management system involves a four-year agreement of results which bring in the strategic

objectives of the ministry and of the government policy. The objectives of the agreement are adjusted and monitored annually. The apparent complexity is helped by the congruence of the governmental policies and the strategy of FIOH.

The Board of Directors is the decision-making body for the most general strategic matters. The Board approves FIOH's strategy, decides on the budget and activity plan and approves the annual activity report. The Board of Directors and the Executive Committee hold strategy seminars twice or three times a year to in order to facilitate the dialogue on strategic matters.

Making societal results, the long-span, system-level development is organized into strategic programmes. There are altogether 22 strategic programmes, the aim of which is to execute the seven strategic goals in FIOH's strategy. Each of the strategic programmes has a plan of actions for the strategy period. The operative structure of the strategic programmes is a project portfolio. Their progress is assessed annually by the executive committee. The operative resources come from the Centres of Expertise: the annual budget plan involves an agreement of cooperation and a resource allocation into the strategic programmes. The strategic programmes also make good use of advisory services, training and information services.

Making customer results, named internally "basic operations", consist of demand driven activities and tasks agreed separately with the authorities. Most of this mode of operation is organized as product lines. There are five product lines for advisory services, and a product line for training and for information products. The product lines are further divided into product families. The responsibility of each product line is allocated to a Centre of Expertise. In addition, there is a coordinating control group for the advisory services, for training and for information activities. The new JOTI ERP system offers a common sales process, as well as a common CRM, to all of the product lines.

Corporate communication is a service activity available both to the top management of FIOH as well as to all activities of FIOH when general public visibility or contacts to decision makers is needed. The main corporate communication services are listed in the following table:

Table 8.1.1 FIOH's main corporate communication services.

	Output (quantity/year)
Media contacts: press releases and follow-up of media coverage.	50 press releases, 10 press conferences
Contacts with stakeholders and other Public Relations	A plan of stakeholder contacts. 15-17 VIP-visits yearly Electronic newsletter with almost 3000 subscribers 6 presentations for students 2 seminars on working life
Coordination of brand and image *	Graphic Guidelines General advertising. Updating the FIOH general information on the web.
Publishing of Annual Report and brochures	Annual Report in Finnish and English. Brochures of FIOH in Finnish, English and Swedish.
Fairs and exhibitions	Participation in 5-8 larger exhibitions. Participation in 15-20 smaller exhibitions.

Research and Development (R&D) is one of the four core functions of FIOH. Its share of the total annual person years has been around 42-43 % in 2006-2008 (when internal services are rolled to core functions). R&D in FIOH is organized into projects. Most of the R&D is done

in the strategic programmes. The units of excellence and other special units have their own action plans that steer their R&D activities. The Centres for Expertise may launch a limited number of R&D projects also outside the strategic programmes in order to create knowledge in new areas. The quality handbook for research activities, the FIOH Good Scientific Practices, has just been renewed.

FIOH's R&D steering committee coordinates and facilitates common R&D activities by offering information, arranging seminars and training courses and launching internal development projects. The Project Office takes care of the practical support. There is also an internal network to gather and disseminate information of the EU opportunities for cooperation and funding.

Specialist Advisory Services is a FIOH core function, which has been under an intense developing during the strategy period. FIOH's aim has been to reinforce a service model through which FIOH can create functional solutions together with the client. FIOH has defined five product lines each with several product families, and clarified roles and responsibilities in the service process. Much effort has been used to change the services from a regional-based or even one specialist-based to a nationally operating service system. Partly, the establishing work is still ongoing. The share of advisory services has been around 34-35 % of total working hours in the period of 2006-2008 (when internal services are rolled to core functions).

The steering group for advisory services is to coordinate the development of the common practises and service formats to improve the relationship between service functions and strategic goals and to follow-up the activities. The steering group e.g. has audited the practices and status of the product families.

Training is a FIOH core function that aims to maintain and promote professional skills of experts and specialists in occupational health services, occupational safety, HRM, production and product development etc. Training activities amount to a share of 10-11 % of FIOH's total working hours (when internal services are rolled to core functions). Three-quarters of the training supply is provided as part of the annual training programme. One-quarter of the training is arranged as tailored and separately-ordered courses. The annual number of courses has totalled between 250 and 280 in 2006–2008. There are around 50 new or renewed courses every year. An E-learning system is available and in use in some of the courses. In addition to courses, some ten events, seminars or conferences are arranged each year. The number of participants has been between 7 000 and 9 000. There is a new ICT system to help the administration of courses.

All training is offered by FIOH's own researchers and experts, and practically no full-time trainers exist in the Institute. The "Good Training Practice Guide" serves as a quality manual guide for the staff participating in the training process. The process support and administration takes about 20 person years annually.

The fourth core function of FIOH is the dissemination of information. The audience of the OHS information comprehends citizens, workplaces, occupational health and safety professionals, and the relevant decision-makers. FIOH's information and communication process consists of four sub-processes as described in the following table:

Table 8.1.2 FIOH's information and communication process.

Sub-process	Resources: process use (annual person years)	Output (quantity/year)	Quality control (e.g internal audit, ext. audit, accredited)
Publishing books	3 editors 1 graphic designer 2 in the book store	30–40 publications	1. internal audit 2 feedback from customers 3. sold copies/turnover
Publishing periodicals	4 editors 1 graphic designer	the TTT periodical 8 issues	1. internal audit 2 feedback from customers 3. sold copies/turnover
Publishing web services	5	approx. 1 million visitors on www.ttl.fi	1. internal audit 2 feedback from customers
Providing library services	5,5	11 699 loans and article copies, 23 900 search requests	1. internal audit 2 feedback from customers

The information and communication activities amount to a share of 12 % of FIOH's total working hours (when internal services are rolled to core functions). There is a steering group whose task is to coordinate the development of the information and communication process. The emphasis of the development has been in the better exploitation of electronic channels. FIOH has started an extensive project for renewing of their website. A web journal will be launched in March 2009.

Project Process is for the successful follow-through of projects. R&D is fully organized as projects, and projects are also used in other activities to organize time and resource-bound entities of work. More than 200 projects apply the project process. The aim is to link decisions about projects and their resources with strategic plans as well to facilitate the management of individual projects. It is the responsibility of the strategic programs to assess and decide of the strategic relevance of a project and the task of the line organization to decide about the resource allocation and the feasibility of a project. There are four sequential sub-processes: the project initiative, planning, execution and completion. Between each of the consecutive phases there is a decision point. The project initiative phase is to ensure the strategic relevance of the project. The planning phase is to ensure resources, funding and other requisites for the execution phase. The objective of the completion phase is again to evaluate the strategic relevance of the outcomes and ensure the utilization of the results.

The project process was renewed in 2008, and there is still some ongoing implementation and refining. A Project Office was established in the beginning of 2009. Its task is to give support to R&D projects in the various phases of the project process. The project office has six part-time employees. The main functions of the office are:

- information and support on applying in essential open calls (domestic and EU)
- support in data protection, ethical and research permission issues of the projects
- support and instructions in project economy
- support and instructions in terms and regulations of funding and funding contracts
- training of project personnel
- follow-up of research publications and project documentation.

The JOTI ERP serves the HR and financial management and reporting of projects.

Productization is for the controlled implementation of products. As a process, it is an application of the Project Process. It offers phases and decision points to ensure the strategic relevance of new products or the renewal of old products. It also aims to ensure the feasibility of the implementation by requiring e.g. quality assessment, market analysis and financial

calculations before a product is accepted into one of our product lines or licensed to a partner. This Productization Process itself has been planned, piloted and partly trained during the recent two years and is now in the implementation phase.

Marketing, Sales and CRM is to serve the core function of Advisory services, Training and Information. The JOTI ERP system offers the basic tools by providing a common customer database, a product database, and bidding, order and invoice processing. Along with the adoption of the new JOTI ERP, there still remains some refining and establishing of the process and tools used in it.

Human Resource Management is arranged into the activities as presented in the following table:

Table 8.1.3 FIOH's Human Resource Management.

	Output
employment counselling for superiors	superior's ability to make right decisions
recruiting	right people in the right place (81 recruitments in 2008)
familiarization	new workers get to know their work and expectations
organisational development	better organization for workers to work
annual personnel training	better and right kind of competence for the work (about 100 internal courses annually)
calculation of salaries	20 400 wage slips and fees

The Centres for Expertise are responsible for the HRM decisions, and there is a team responsible for the support services in HRM.

Technology and Infrastructure is maintained and developed by investment procedures. FIOH's Procurement Committee steers this activity. The Committee prepares the annual investment plan and supervises the development of the infrastructure as well as the purchasing of services, materials and equipment. It also makes decisions regarding long general (framework) agreements. The directors of the Centres of Expertise have the authority to make decisions regarding all maintenance investments and development investments, if the value is less than 15 000 euros. The chairman of the Procurement Committee is the Director General. There are seven other members in the committee, representing occupational hygiene, occupational medicine, physiology expertise, the ICT sector, and finance and procurement services.

ICT in FIOH is outlined as the ICT infrastructure maintenance, Maintenance of applications and ICT Management. There has been an in-depth development of theses processes and the implementation of the changes is still ongoing. The ICT infrastructure maintenance has been largely outsourced. There is an outsourcing process ongoing related to the Maintenance of applications. Both these processes are starting to use standard ITIL (Information Technology Infrastructure Library) procedures. Accordingly, the ICT management system has been renewed in the beginning of 2009; it is making use of new IT cooperation groups for each Centre of Expertise and a steering group.

Financial Administration is largely based on the JOTI ERP system that offers account ledger, account keeping services etc. Also, the processing of purchase invoices is an ICT-supported workflow. JOTI also offers a budget system and budget reporting to the organization units

and for the projects. Even here, the start-up of JOTI means refining and finishing e.g. monthly reports.

Self-evaluation and future challenges and plans

The aim of the strategy and organizational change in 2005-2006 was to change the mode of operations in FIOH. While the change was in the beginning more in mental attitudes, now it has reached everyday practises, and there are still some refinements needed. The change has brought along a lot of internal work and also strain and stress, as at the same time FIOH has maintained and even improved the output to its clients. As many of the internal process developments are now in the implementation phase, this demanding situation will still continue for some time, though at the same time, when the improvements in the processes become more visible, the change becomes more and more energizing.

This stage is a difficult point for the evaluation of FIOH's process. General input/output indicators show FIOH does, at least slightly, and in some processes clearly better then three or four years ago.

The matrix nature of FIOH's organization and management means inbuilt instability that is aimed to bring in dynamics and agility. At the same time, there is always the danger that the internal processing takes too much effort, and as established processes are effective for given tasks, in a rapidly changing environment, they become rigid and ineffective. Finding and deliberately managing the balance is the challenge in future process management.

8.2 Technologies

Technology strategy

FIOH's strategy challenges us to focus on the most relevant issues in working life, and to review its activities as an innovation chain. This means FIOH needs techniques, methods and expertise (i) to obtain information of a scientific nature on a strictly bounded segment defined by the strategy document as well as (ii) technologies to produce practical solutions in collaboration with FIOH's clients and partners.

For investment policy, FIOH has grouped its technologies as (1) cutting edge technologies, (2) key technologies and (3) the infrastructure. FIOH's technology set-up is shown in table 8.2.1.

Investment policy

Cutting edge technologies are the techniques, methods and expertise that FIOH needs in order to obtain new scientific information about major problems and new risks in working life. Through state and project funding, FIOH invests in the infrastructure of the special R&D units for research and development on an international level. Investment in the instrumentation of the technology-intensive topics FIOH's strategy requires, such as nanoparticels and non-ionizing electromagnetic radiation, is also a top priority.

Key technologies are the techniques, methods and expertise that FIOH needs to obtain practical information and to produce solutions for the risks in Finnish working life. Through state and project funding, FIOH maintains laboratory facilities that enable simulation, visualization and experimental study, both in real and virtual space. FIOH invests in the instrumentation of its product lines on the basis of cost correlation. The depreciations of the investments are taken into account in the pricing of FIOH's products.

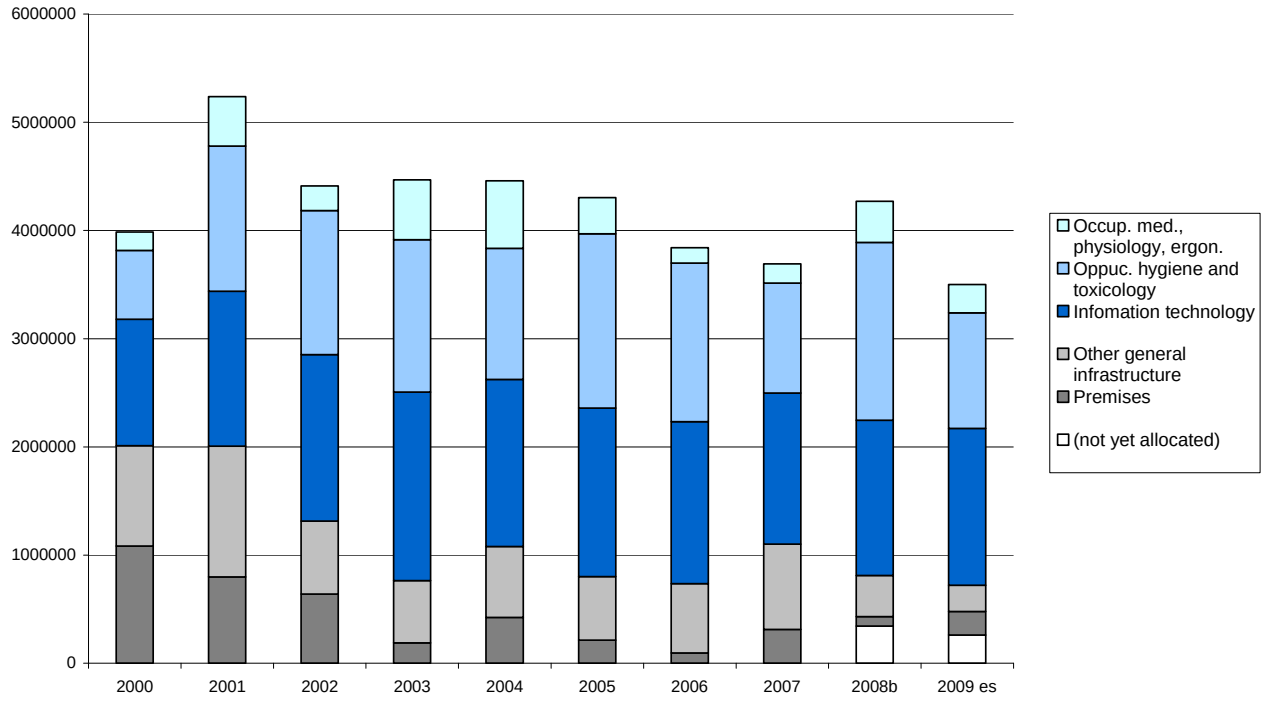
FIOH divides the infrastructure into ICT infrastructure and general infrastructure. At the beginning of 2009, FIOH is going through the process of outsourcing several IT functions, such as service desk and server care. This means, in the future, FIOH will not recruit staff for basic IT tasks or invest in e.g. server rooms. As regards IT infrastructure, FIOH prefers on-demand type services for its own investment. The focus of IT investments will be for the needs of FIOH's core processes.

The premises are leased from Senaatti Kiinteistöt Oy, which is a state-owned corporation.

Statistics

Annual investments amount to 3.5-5.0 million euros. On average, occupational hygiene and toxicology accounts for 33 %, occupational medicine, physiology and ergonomics 8 %, information technology 40 %, and premises and other general infrastructure 19 % of the total volume.

Table 8.2.1 FIOH's technology set-up (Y-axis = Annual Investment €).



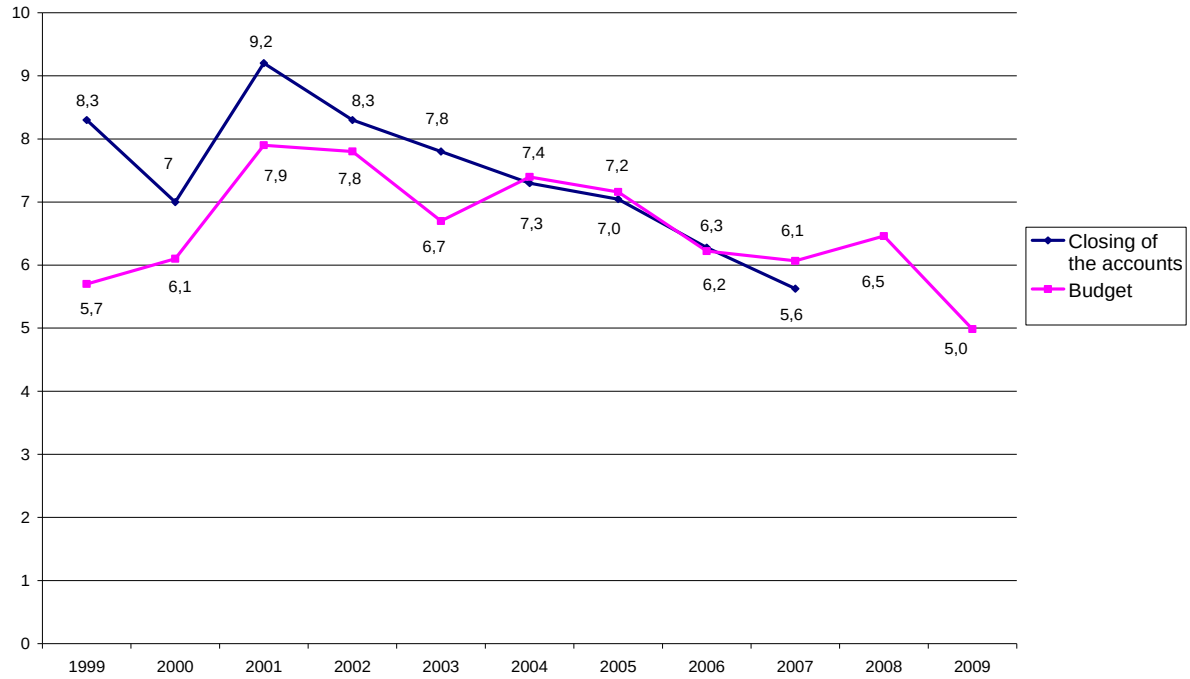
At the beginning of this decade, there was an intensive period of reconstruction and renovation of the FIOH premises in Helsinki, which entailed a high investment volume in the general infrastructure.

The share of information technologies rose in the middle of the decade mainly due to the introduction of new software applications, such as document management and web services. At present, FIOH is launching a new ERP (JOTI) system that covers financial, HR, CRM and project management. The ERP system provides us with solid and cost-efficient software architecture for the future.

A rationalization plan of the chemistry and biomonitoring laboratories was put into action in 2007. Laboratory analyses were concentrated, and FIOH now has fewer laboratories. The outcome is a more efficient use of the laboratory facilities and a lesser need for maintenance investments.

Today's share of investments is 5-6 % of FIOH's total expenses. The reasons for this decline are (1) The period of intensive investment in the premises and other general infrastructure has now ended (2) The execution of the laboratory rationalization plans and (3) The rearrangement of IT functions.

Table 8.2.2 Budget and closing of the accounts.



Y-axis = percentage of investments from the total expenses

The proportion of development investment is on average 15-20 % of annual investments. Development investment refers to the acquisition of new technologies for FIOH's needs. FIOH will not let the present level of development investments fall any further.

Rationalization investments are on average 30 %. Rationalization investment refers to the acquisition of technologies which enable more efficient functions and processes, e.g. software applications.

Maintenance investments are updates and renewals of present equipment. They account for 50–60 % of the volume of total investments. The need for maintenance is lower today than at the beginning of the decade thanks to e.g. structural changes in laboratories and the ICT sector. In the future, however, FIOH cannot compromise its work environment or productive means, which means that it has to stabilize the volume of investments.

Partnerships

In FIOH's role of expert, it participates in developing the safety features of materials, tools, constructions and work methods of its clients and other interest groups.

Collaboration with national and international actors in the field of health and safety is one of the basics of FIOH's competence. Technical know-how is in many cases a significant issue in collaboration with e.g. universities, Finnish public sector research institutes, and their equivalents abroad (STUK, VTT, MIKES, GBIA, INRS, ICNIRP and INVENT to mention a few). High-quality equipment and demanding laboratory techniques are mandatory in the field of modern biomedicine research today. Due to the utilization of cutting-edge technologies with high-quality equipment in FIOH's research, it has become attractive to collaborators, both nationally and internationally. This in turn increases FIOH's possibilities to be in the fore-front of research in FIOH's strategic focus research areas. In the area of clinical activities of medical engineering and diagnostics, there is a close collaboration with the University Hospitals in Finland and EU countries.

FIOH's laboratory equipment mainly consists of commercial products. The development of its own methods is important. In applied physiology, the hi-tech companies of hardware and software are very important partners. In human physiological evaluations, the new ambulatory tools have enabled us to perform more precise measurements in a real working environment and to combine the recordings of work strain to the individual performance capacity. The biomedical technology has also revealed new possibilities to recognize early signs of work-related diseases and decreasing functioning. The role of FIOH has been to modify the technology for the needs of occupational health care and to give ideas for the reporting and interpretation of the results. In addition, with FIOH's expertise and facilities, it can give added value for many national and international legislations, good practises, standards, and methods.

Table 1. Laboratories and technologies in the competence centres of FIOH

	HUMAN FACTORS AT WORK	HEALTH AND WORK ABILITY	WORK ENVIRONMENT DEVELOPMENT	WORK ORGANIZATIONS	GOOD PRACTICES	INTERNAL SERVICES
CUTTING EDGE TECHNOLOGIES	**BRAIN AND WORK RESEARCH CENTRE** • **BRAIN@WORK LABORATORY** • **DYNAMITE LABORATORY** • **SLEEP LABORATORY**	**LABORATORY OF IMMUNOTOXICOLOGY** • **HUMOROL AND CELL IMMUNOLOGY** • **PROTEOMICS** **LABORATORY OF MOLECULAR AND CELLULAR TOXICOLOGY** • **GENOTOXICOLOGY** • **MOLECULAR BIOLOGY**	• **MASS SPECTROMETRY AND ELECTRON MICROSCOPY FOR AEROSOL PHYSICS AND MATERIAL TECHNOLOGY (NANOPARTICLES)** • **EM RADIATION LABORATORY AND NON-IONIZING RADIATION**		**REGISTERS**	

KEY TECHNO-LOGIES	OCCUPATIONAL SAFETY LABORATORIES	LABORATORIES OF PHYSIOLOGY	BIOMONITORING	CLINICAL PSYCHOLOGY EXAMINATIONS	STATISTICAL ANALYSIS
	• REAL ROOM • VIRTUAL ROOM ERGONOMIC TEST • TEST ROOMS IN TAMPERE AND OULU	LABORATORIES OF PHYSIOLOGY IN HELSINKI AND OULU • LABORATORY OF HUMAN FUNCTIONAL RESERVES, WORK ABILITY EXPERIMENTS, THERMAL LABORATORY AND POOL (HKI) • WIND TUNNEL, THERMAL CHAMBER AND POOL (OULU) OCCUPATIONAL OUTPATIENT POLYCLINIC AND INPATIENT WARD • EXPOSURE LABORATORY • CLINICAL LABORATORY, X-RAY, CLINICAL NEUROPHYSIOLOGY • CLINICAL OCCUPATIONAL DERMATOLOGY • LABORATORY OF PATHOLOGY MUSCULOSCELETAR LABORATORIES MUSCULOSCELETAR MEASUREMENTS	OCCUPATIONAL HYGIENE MEASUREMENTS AND LABORATORY ANALYSIS • CHEMICAL LABORATORIES IN HELSINKI, TURKU AND TAMPERE • AEROSOL LABORATORY • MICROBIOLOGICAL LABORATORIES IN HELSINKI, KUOPIO AND OULU • PHYSICAL LABORATORIES IN HELSINKI: ELECTROMAGNETIC FIELDS, • PHYSICAL LABORATORIES IN TURKU: INDOOR ENVIRONMENT • PHYSICAL LABORATORY IN LAPPEENNRANTA: EMISSIONS FROM EQUIPMENT • PHYSICAL LABORATORY IN KUOPIO: ACOUSTICS LABORATORIES OF PERSONAL PROTECTIONS EQUIPMENTS TESTS	RECRUITMENT SUITABILITY STUDIES	

INFRA-STRUCTURE	**LABORATORY AND OFFICE PREMISES** **IT INFRASTRUCTURE**	**LABORATORY AND OFFICE PREMISES** **IT INFRASTRUCTURE**	**LABORATORY AND OFFICE PREMISES** **IT INFRASTRUCTURE**	**OFFICE PREMISES** **IT INFRASTRUCTURE**	**OFFICE PREMISES** **IT INFRASTRUC-TURE** **WWW-SERVICES** **BOOKSTORE**	**OFFICE PREMISES** **IT INFRASTRUC-TURE** **IT-GOVERNANCE**

9 Human Resources

Number and structure of personnel

At the end of 2008, 899 persons were employed by FIOH, which shows a decrease of 2 persons compared to the previous year. Women comprised 70 %, and the average age of personnel was 46 years (the same as in 2006 and 2007). The number of male and female superiors was almost equal (men 57 %, women 43 %).

Table 9.1 Structure of personnel.

	2006	2007	2008
Personnel	891	901	899
Person-work-years	802	809	799
- state funded	572	577	572
- self funded	230	232	227
Permanent employments	637	637	624
Temporary employments	240	244	243

The number of personnel remained very similar in comparison to previous years. FIOH's work input in 2008 was 799 person years. State-funded person years totalled 572, thus amounting to 72 % of the total, and 227 were funded by FIOH's own income. The number of person years has decreased somewhat from the previous years (802 in 2006 and 809 in 2007). Of the staff, 27 % were working on a temporary basis. The distribution of researchers and specialists, physicians, other health care personnel, leadership positions and personnel involved in the production of support services can be seen in the following table 2.

Table 9.2 Occupational groups of personnel (%).

	2006	2007	2008
Researchers and specialists	60 %	58 %	56 %
Physicians	10 %	11 %	11 %
Health care personnel	6 %	6 %	5 %
Support services personnel	21 %	22 %	21 %
Leadership positions	8 %	7 %	8 %

2008 saw a number of structural changes that had a direct impact on FIOH’s employees and their well-being. The outplacement of ICT function reduced the workforce by 13 employees. Decisions on further restructuring concerning payroll services, announced in October 2008, will probably affect 3 employees in the year 2010. Reductions in the workforce are difficult to make, but crucial in order to safeguard the long-term profitability of FIOH and the future of its employees.

Out of the permanent staff, 74 persons changed employers in 2008 (46 in 2006 and 54 in 2007). Personnel turnover increased slightly but remained relatively stable. Turnover of permanent staff was 10 %, and employment lasted an average of 22 years. 21 employees

retired, and the average retirement age was 63.8 years, which is high above the national average retirement age of 60 years.

A total of 81 new employees were recruited during the year 2008. As competition for quality employees continues to be fierce, it is increasingly crucial for FIOH to find and recruit the right talents to meet the current and future needs. To facilitate the acquisition of new staff, the recruitment process at FIOH was made more efficient, more transparent and having better quality during the year 2008. Organization-wide recruiting practises were developed, an open applicant pool was launched in the internet sites, and a shared induction model was created to support supervisors to assist new employees in becoming familiar with their own job and the organization’s ways of working. Also, more attention was paid to the development of FIOH's employer image e.g. among students and recently graduated talents.

Occupational health and well-being at work

Sick-leaves decreased from the previous year's level, 3.4 % to 3.3 % (3.1 % in 2006). However, the amount of longer sick-leaves grew together with disability pensions. The sick-leave percentage remains still clearly lower than the average among the members of the Confederation of Finnish Industries which was 4 % in 2008.

A special emphasis of occupational health services at FIOH is placed on preventive action and health promotion through health checks and risk assessment of the working environment. In addition to this, during the year 2008, a new development programme called TYÖTIE was established. The aim of this programme is to improve personnel's working ability and prevent long-lasting absenteeism due to sickness or other causes. Very crucial in this method is to prepare FIOH's supervisors to handle and solve difficult situations in their work community.

A safe working environment is an inherent part of corporate responsibility and results in better quality of work. The aim is to work proactively to prevent the occurrence of near-misses and accidents. In 2008, the total number of accidents in FIOH was 28 (31 in 2006 and 17 in 2007). A new near-miss incident reporting model was introduced to further improve safety at work by identifying beforehand situations that pose a risk.

Human resource strategy

The aim of FIOH's human resource strategy is to ensure the availability of skilled and committed personnel needed by FIOH's operation. The other aim is to develop such human resource policies that allow utilizing the existing intellectual capital in achieving common goals.

FIOH identifies requirements for future core competence

The goal of competence management is to secure FIOH's ability and recourses to achieve future visions. This is achievable only when all FIOH's employees constantly acquire new skills and competencies in line with the principles of long-life learning. The level of education among FIOH employees is high: in 2008, 65% were university graduates and 23% had a doctoral degree. The Centres of Expertise maintain and develop the competence of their

personnel with the aim of balancing functional needs and the quality and quantity of competence in an optimal way.

Table 9.3 Degrees of personnel.

	2006	2007	2008
Doctorates	170	182	185
Licentiates	58	58	53
University degrees	316	332	346
Bachelor's degrees	34	35	35
college-level degrees	312	296	280

In FIOH, the most significant structural change in 2006 involved its 16 departments integrated into the six Centres of Expertise. These centres assure the needed core competencies. During the years 2007-2008, a model by means of identifying core competencies based on future needs was designed and piloted. Following are the core competencies of each Centre of Expertise:

- Work organizations
  - Development and management of well-being in organizations and work communities
  - Supporting participative and innovative change processes
  - Promoting participation in working life at different life stages
- Human Factors at Work
  - Well-being at work through developing work tasks
  - Safe and accident-free work
  - Cognitive functional capacity and work
- Work Environment and Development
  - Goal-orientated and proactive development of workplace safety
  - Risk management as basis for development of productivity and well-being
  - Effective work environment development and protection against adverse factors
- Health and Work Ability
  - Occupational health services' activities and problems
  - Interaction between work and functional capacity
  - Origins of occupational and work-related diseases
- Good practices and Competence
  - Changes in working life and related research
  - Need for knowledge in working life
  - Promoting work ability and health at the workplace and in occupational health care
- Internal services
  - Process and network know-how

As a knowledge-based organization, FIOH also promotes crucial common skills in many ways. These skills are business and client orientation, scientific approach, social and communicational skills and innovativeness. With active collaboration between FIOH and other network partners, the main goals have been realized.

FIOH invests strongly in competence development and continuous learning. Training - both internal and external - amounted to 1.4 % of paid working time. The percentage was almost the same, 1.5 %, in 2006 and 2007. The number of training days per employee was 3.6 days which is virtually the same as in 2006 and 2007.

Human resources development

Career Paths support long-term development of personnel in FIOH. In 2007, Career Path models were introduced for researchers, specialists, health care personnel and consultants. The aim of Career Paths is to describe a person's competencies at a certain point in his or her career.

FIOH's training activity is based on the needs of its units. During the years 2007-2008, FIOH rose to the challenge by organizing two new training programmes for a Specialist Qualification in Leadership and Specialist vocational qualification of product developing at FIOH for the first time. All together, 30 superiors and 13 product experts began the training.

As legislation requirements and work hygienic circumstances changes, it was necessary for FIOH to react to the upcoming challenges for the future. FIOH's focus in personnel training during the years 2009-2011 lies with work hygiene know-how as 30 % of work hygienists are retiring within the next five years. An internal training course has been developed to ensure a good level of work hygienic knowledge also in the future.

Development discussions were used as a tool

Development discussions are an inherent part of annual planning and target implementation in FIOH. The discussions set the targets for each employee and make a development plan based on skills evaluation. In this discussion between the supervisor and the employee, professional competencies as well as interaction and the knowledge of FIOH's products are evaluated.

FIOH has carried out two mentor programmes during the years 2006-2009. Mentorship refers to a developmental relationship in which a more experienced person helps a less experienced person to develop in a specified capacity. The areas of coaching have been, for example, career think over, tacit knowledge transfer, expanding networks as well as strengthening superior knowledge of the actor.

Work Climate Questionnaire

Listening to and acting upon the views of FIOH's personnel are key to ensuring that FIOH continues to take the right steps to create a work environment that makes people want to remain with FIOH. The Work Climate Questionnaire from 2006-2008 shows that the strengths of FIOH are clear and well-recognized goals, opportunities to influence the content of one's work, meaningful work content, good leadership and teamwork together with inter-team collaboration. Opportunities for personal development were also considered good. These strengths are fundamental in making FIOH's strategic work possible. Organization of work in a way that prevents excessive strain on the personnel was seen as an important object of development. The low level of pay and practises of rewarding for good work also received criticism.

10 Finances

FINANCIAL TRENDS 2005-2008							
(mill.euro)	2005	2006	Change% 05/06	2007	Change% 06/07	2008	Change% 07/08
Expenditure							
Staff expenses	36,4	35,4	-3	38,2	8	40,3	5
Premises	8,0	8,0	0	8,3	4	8,5	3
Other expenses	13,6	13,4	-1	14,0	4	14,5	4
Total	**58,0**	**56,8**	-2	**60,4**	6	**63,3**	5
Equipment	4,6	3,7	-19	4,4	20	4,2	-6
Pension Fund	2,2	0,7	-70	0,7	10	0,8	10
Grand total	**64,8**	**61,2**	**-6**	**65,6**	**7**	**68,3**	**4**
Own income							
Research	6,8	7,1	4	7,9	12	8,4	6
Training	4,1	5,0	20	5,2	6	5,0	-5
Information	1,1	1,3	26	1,3	-1	1,1	-17
Services	10,3	11,7	13	11,1	-4	12,3	10
Other	1,0	1,1	6	1,4	27	1,6	11
Pension Fund	1,6	0,1	-93	0,6	492	-0,2	-138
Total	**24,9**	**26,2**	**5**	**27,7**	**5**	**28,1**	**1**
Govern.support, used	39,2	36,3	-7	38,1	5	39,0	2
(Govern.support, granted)	37,7	37,8	0	38,2	1	38,2	0
Grand total	**64,1**	**62,6**	**-2**	**65,8**	**5**	**67,1**	**2**
Govern.support % of expenditure	60,5	59,4		58,1		57,1	

Table 10.1 FIOH's financial trends in 2005–2008.

There has been no really significant change in the financial structure over the period 2005-2008. The main conclusion is that the government support has deteriorated from year to year from 60.5 % to 57.1 %. This has added to the demand for own income. Research grants and market-based services have met the challenge accordingly.

Research income						
	2003	2004	2005	2006	2007	2008
European Union	1 465	1 410	750	833	1 179	1 229
FWEF*	1 254	1 280	1 357	1 186	1 136	1 828
TEKES**	410	770	584	884	1 207	1 298
Ministry of Social Affairs and H	494	900	1 437	1 208	1 030	889
Academy of Finland	87	65	135	242	656	1 024
Others (more than 100)	2 673	2 876	2 473	2 715	2 718	2 162
	6 383	7 301	6 736	7 068	7 926	8 430
*Finnish Work Environment Fund						
**Finnish Funding Agency for Technology and Innovation						

Table 10.2. Research income in 2003–2008

Research grants from TEKES and the Academy have gradually increased over the period. Grants from FWEF in 2008 are probably an exception in the long run.

Table 10.3 Financial structure by activities 2005–2008 on average.

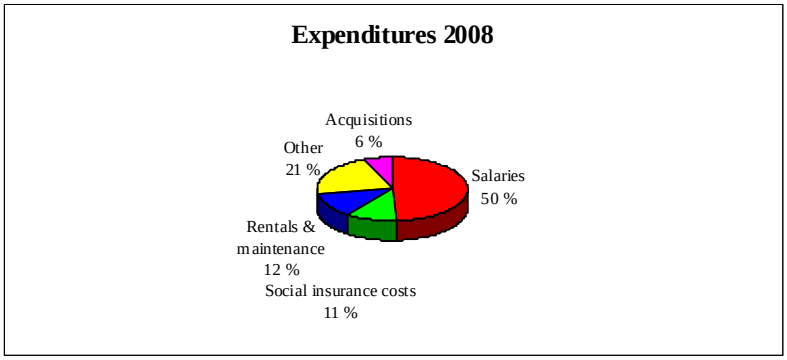
Activity	Own income % of expenses	Support
Research & development	29%-33%	71%-67%
Training, market-based	85%-99%	15%- 1%
Training, supported	27%-32%	73%-68%
Information	8% -18%	92%-82%
Services, market-based	80%-100%	20%- 0%
Expert services	0%	100%
Total FIOH	**39%-43%**	**61%-57%**

Table 10.4. Finances 2008

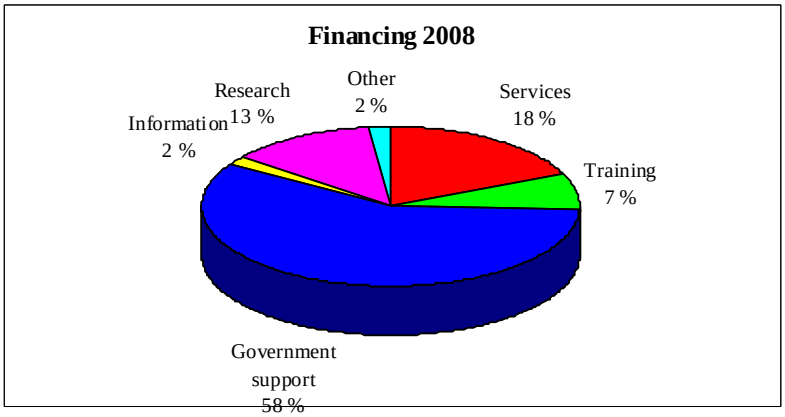
FINANCES 2008

(mill.euro)

Expenditures	2008
Salaries	33,4
Social insurance costs	7,7
Rentals & maintenance	8,5
Other	14,5
Acquisitions	4,2
	68,3



Financing	2008
Services	12,3
Training	5,0
Government support	39,0
Information	1,1
Research	8,4
Other	1,3
	67,1



Own income in details		**2008**
Research		**8,4**
European Union	*1,2*	
FWEF	*1,8*	
*TEKES**	*1,3*	
Ministry of Social Affairs and Hea	*0,9*	
Academy of Finland	*1,0*	
Others	*2,2*	
Training		**5,0**
Information		**1,1**
Services		**12,3**
Occup. medicine	*3,5*	
Occup.hygien	*5,9*	
Occup. psychol	*1,4*	
Other	*1,4*	
Other		**1,3**
Total		**28,1**

*Finnish Funding Agency for Technology and Innovation

Table 10.5 From work time to euros 2008.

Activity	% work time	mill. euro
Research & development	43	29,4
Training, market-based	6	4,1
Training, supported	4	2,7
Information	13	8,9
Services, market-based	25	17,1
Expert services	9	6,1
Total FIOH	100	68,3

Appendix: The 2009 International Evaluation Goup

CVs

Göran Bondjers, PhD, is presently Dean and Director of the Nordic School of Public Health. He is Professor of Cardiovascular Medicine at the University of Gothenburg, and Director of the WHO collaborating Centre for Capacity Building in Public Health in Gothenburg. He was previously Dean of the medical faculty at the University of Gothenburg, and Director of the Wallenberg Laboratory in Gothenburg and of the Swegene Research Infrastructure Programme. In addition, he has held a number of international positions, received awards for research, and published more than 260 research papers.

Paulien M. Bongers, PhD, is Research Manager of TNO Work and Employment of TNO Quality of Life in the Netherlands. She is also Head of the Department for Work, Safety and Health, Co-Director of Body@Work, Research Center Physical Activity, Work and Health TNO-VUmc, and has a professorship in 'Prevention of work related health effects' at the Department of Public and Occupational Health at the VU University Medical Centre in Amsterdam. She has been a member of the editorial (advisory) board of Applied Ergonomics and the Scandinavian Journal of Work Environment and Health. Recently she was also a member of the evaluation committee of the Danish National Research Centre for the Working Environment. She is an epidemiologist and has conducted several large-scale epidemiological studies on the prevention of work-related musculoskeletal and psychological disorders and is one of the most cited authors on these topics. Her recent studies focus on the evaluation of cost effectiveness of interventions for prevention and stimulating physical and mental health.

Marilyn A. Fingerhut, PhD is retired from the National Institute for Occupational Safety and Health (NIOSH) in the United States after serving 25 years in research and management positions, including a two year assignment at the World Health Organization in Geneva, Switzerland. Her areas of interest in epidemiologic research are global risk assessment, dioxin, carcinogens, and the issues of women workers. She currently plays a consultant's role as the International Coordinator for NIOSH, and as the Co-Coordinator of the WHO Global Network of 65 Collaborating Centers in Occupational Health. Dr. Fingerhut was Chair of the 2004 evaluation of the Finnish Institute of Occupational Health.

Timo Kauppinen, PhD has worked as a research manager in the European Foundation for the Improvement of Living and Working Conditions (Eurofound), Dublin since 1997 and retired in 2008. Before that he spent ten years as research manager in the Ministry of Labour in Finland, and was secretary general in the Committee for Industrial Relations in Finland from 1974 to 1989. He has been an adjunct professor in Helsinki University since 1995 and was lecturer in the Helsinki Economic University from 1972 to 1974. In 1991 he set up the Finnish Work Life Association and acted as chairperson from 1991 to 1997.

Stavroula Leka, PhD is Associate Professor in Occupational Health Psychology at the Institute of Work, Health & Organisations, University of Nottingham. She is a Chartered Psychologist, a Member of the British Psychological Society, the European Association of Work & Organisational Psychology, the International Commission on Occupational Health, and the European Academy of Occupational Health Psychology, and a Fellow of the Royal Society for Public Health. She is a member of the Planning Committee of the World

Health Organization Network of Collaborating Centres in Occupational Health, and Chair of its programme of work on ‘Practical Approaches to Identify and Reduce Occupational Risks’. She is also secretary of the 'Work Organization & Psychosocial Factors' ICOH scientific committee. Her expertise lays in the translation of occupational health and safety knowledge and policy into effective practice, and particularly into the management of psychosocial risks, work-related stress, and the promotion of mental health at workplace level.

Paul A. Schulte, PhD, is the Director of the Education and Information Division, and Manager of the Nanotechnology Research Center, at the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. Dr. Schulte has served as a consultant for the International Agency for Research on Cancer, the World Health Organization, and the International Programme for Chemical Safety. He is co-editor of the “Molecular Epidemiology: Principles and Practices” textbook. He has served as guest editor of the Journal of Occupational Medicine and the American Journal of Industrial Medicine and was on the initial editorial board of Cancer Epidemiology, Biomarkers and Prevention.

Vappu Taipale, Professor, MD is specialized in child and adolescent psychiatry. She served as Finland’s Minister of Health and later as Minister of Social Affairs. Dr. Taipale has been director general of both the National Board of Social Welfare and of Stakes, National Research and Development Centre for Welfare and Health in Finland and has held chairmanships of academic and technological research bodies both nationally and within the European Union. She was both a member and the chair of the United Nations University Council. After retirement she has been actively involved in the WHO Collaborating Centre for Mental Health Promotion, Prevention and Policies and is currently co-president of the International Physicians for the Prevention of Nuclear War (IPPNW).

Hannu Uusitalo, PhD, Professor is currently Director of Research, Statistics and Planning at the Finnish Centre for Pensions. Before this he was Deputy Director General of STAKES, the National Research and Development Centre for Welfare and Health (Finland), a “sister organization” of FIOH. He has also been a member of the Research Council for Culture and Society of The Academy of Finland for six years. He left Helsinki Economic University in 1991 after working there as professor of sociology for ten years. He has been either the evaluator or a member of evaluation groups of several Finnish institutes and one Nordic institution.

Appendix: Customer and stakeholder input to the 2009 evaluation

The International Evaluation Group interviewed a number of FIOH's customers, stakeholders and partners.

The group met with the FIOH's Board of Directors consisting of the representatives of the following organizations: Ministry of Social Affairs and Health, Ministry of Employment and the Economy, Confederation of Finnish Industries (EK), Central Organization of Finnish Trade Unions (SAK), Finnish Confederation of Salaried Employees (STTK), Central Union of Agricultural Producers and Forest Owners (MTK), Commission for Local Authority Employers and Finnish Medical Association.

In addition to the Board of Directors and representatives of the Ministry of Social Affairs and Health, the group met with the following representatives:

- Arto Satonen, Chair of Employment and Equality Committee, Parliament of Finland
- Kaarina Myyri-Partanen, Director, Uusimaa Occupational Safety and Health Inspectorate
- Leila Rautjärvi, President, The Finnish Association of Occupational Health Nurses (FAOHN)
- Rea Lagerstedt, President, Finnish Association of Occupational Health Physicians
- Pekka Puska, Director General, National Institute for Health and Welfare (THL)
- Jussi Huttunen, ex-KTL, one-man committee; Senior Advisor, Finnish Innovation Fund (SITRA)
- Markku Vanhanen, Medical Director, Finnair Group
- Jan Schugk, Director, Occupational Health and Safety, Nokia
- Aslak Savolainen, Leading Medical Officer of the Occupational Health Services, Finnish Broadcasting Company YLE
- Ulla Juuti, Coordinator of Occupational Safety, UPM-Kymmene
- Pentti Kalliokoski, Professor, University of Kuopio
- Jukka Pelkonen, Dean, University of Kuopio
- Juha Pekkanen, Manager, National Institute of Health and Welfare, Kuopio Unit
- Erkki Yrjänheikki, Director, Department for Occupational Safety and Health, Ministry of Social Affairs and Health, Tampere
- Tarja Nupponen, Senior Inspector, Department for Occupational Safety and Health, Ministry of Social Affairs and Health, Tampere
- Markku Räsänen, Assistant Regional Manager, Häme Occupational Safety and Health Inspectorate, Tampere
- Clas Håkan Nygård, Professor, University of Tampere, Tampere School of Public Health
- Jouni Kivistö-Rahnasto, Professor, Tampere University of Technology, Department of Industrial Management, Safety Management and Engineering
- Arto Säämänen, Senior Research Scientist, VTT, Management of the production environment and air filter technology, Tampere
- Tapani Rönnemaa, Professor, Dean, Faculty of Medicine, University of Turku
- Aki Lindén, Chief Executive Officer, Hospital District of Southwest Finland, Turku
- Marja Salmi-Tuominen, Personnel Director, City of Turku

- Henri Wibom, Managing Director, The Federation of Finnish Enterprises, The Regional Organization of Enterprises in South-West Region, Turku
- Ari Rajamäki, Safety Delegate and Member of the Board, STX Europe, Turku
- Jarmo Taipale, Leading Medical specialist in Occupational Health, UPM-Kymmene, Lappeenranta
- Matti Bergbacka, Chief of Safety, Nordkalk, Lappeenranta
- Kirsti Riihelä, County Surgeon, County Administrative Board of South-Finland, Lappeenranta
- Timo Kärki, Professor, Lappeenranta University of Technology
- Jarmo Pirhonen. Director, Employment and Economic Development Centre of South-East Finland, Lappeenranta
- Leena Yliniemi, Docent, University of Oulu
- Ahti Rönkkö, Safety Manager, Kemi-Torniolaakso Educational Federation of Municipalities, Lappia, Oulu
- Ari Peitso, Director of the Centre of Military Medicine, Finnish defence forces, Oulu
- Jorma Mäkitalo, Director of Research and Development, Specialist in Occupational Health, Verve Consulting

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